State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Northern District

SUMMARY OF OPERATIONS

FOR

WATERMASTER SERVICE IN NORTHERN CALIFORNIA

1991 Season

APRIL 1992

Douglas P. Wheeler
Secretary for Resources
The Resources
Agency

Pete Wilson
Governor
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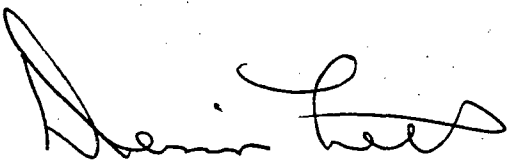
FOREWORD

This report describes the watermaster service provided by the Department of Water Resources to areas in Northern California during the 1991 irrigation season. Authority for its preparation and publication is stated in the California Water Code, Division 2, Part 4, Chapter 7.

This report presents information about 1991 watermaster service in two sections. The first section gives general introductory information about water rights, water supply, service areas, and watermaster duties; the second section describes the fifteen active service areas, thirteen in the Department's Northern District and two in the Division of Operations and Maintenance, Oroville Field Division. Each of these service area descriptions gives detailed information on the area, the basis of watermaster service, sources of water supply, methods of distribution, 1991 water distribution, and personnel used.



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INTRODUCTION

Purpose and Benefits

The main purpose of watermaster service is to distribute water according to established water rights. This is done by apportioning to the rightful users the available supplies in streams that have had water right determinations.

Distribution of water in watermaster service areas is the lawful duty of the Department of Water Resources as directed in Part 4 of Division 2 of the California Water Code. Under watermaster service, water right holders are assured that their rights are protected without their having to take legal action against other users.

A major benefit of watermaster service to water users and the State is that court litigation and violent conflict, which in the past happened often, are now rare. Also, available supplies of water are better used, as waste is reduced through careful management.

Because both the water right holders and the State receive benefits from watermaster service, the costs of performing the service are shared. The State general tax fund pays one-half of the cost of operating each service area and the water right holders in the service area pay the other half. Individual users' shares are determined in accordance with Article 3 of Chapter 7 of the above-mentioned Part 4 of Division 2 of the Water Code. Although this work is done as efficiently as possible, considerable public funds are needed to (1) maintain skilled representatives in the field during the dry months of the growing season, and (2) maintain administrative support at Department headquarters. Nevertheless, most clients find the benefits of fair, reliable, and comparatively worry-free distribution of water to be far superior than doing without the State watermaster service.

Determination of Water Rights

Many of the streams under State watermaster service have had their water rights defined by the courts under one of three adjudication procedures. These judgments establish each holder's rights in terms of rate of diversion, season of use, point of diversion, and place of use. They also establish priorities whereby each holder's rights is ranked according to the rights of all other decreed holders. Under this system, all rights of any one priority must be fully satisfied before water can be diverted to holders of lower priority rights. The determinations of the courts are commonly called decrees.

Water rights decisions necessary for establishing watermaster service areas are accomplished by the following methods: (1) a statutory adjudication which defines all water rights on the stream; (2) a court adjudication which results when two or more parties have their water rights defined; and (3) a court reference whereby the State Water Resources Control Board makes an investigation and reports to the court regarding water rights of the parties involved. Water rights on Pine Creek near Alturas were determined by an agreement of the water users.

Non-Judicial Decisions

A permit or "license to appropriate" can be issued by the State Water Resources Control Board (SWRCB), or agreement can be reached by mutual consent of the water users involved.

Court Adjudication

A less extensive method of defining water rights is the "court adjudication" procedure. This type of adjudication results when two or more parties involved in a water rights dispute seek a solution to their problem under civil law. A decision handed down in such a civil action determines only the water rights of the parties involved in the action and therefore does not necessarily define all water rights on the stream. As a result, serious conflicts sometimes arise between decreed water right holders and persons claiming longer-standing riparian or appropriative rights that were not specified in the decree.

Court Reference

The "court reference" type of adjudication arises when a civil action, as discussed, is referred to SWRCB for a determination under authority contained in Sections 2000-2076 of the Water Code. The Board's report becomes the basis for the court's decision. As in court adjudications, a court referee determines only the water rights of the parties involved in the action.

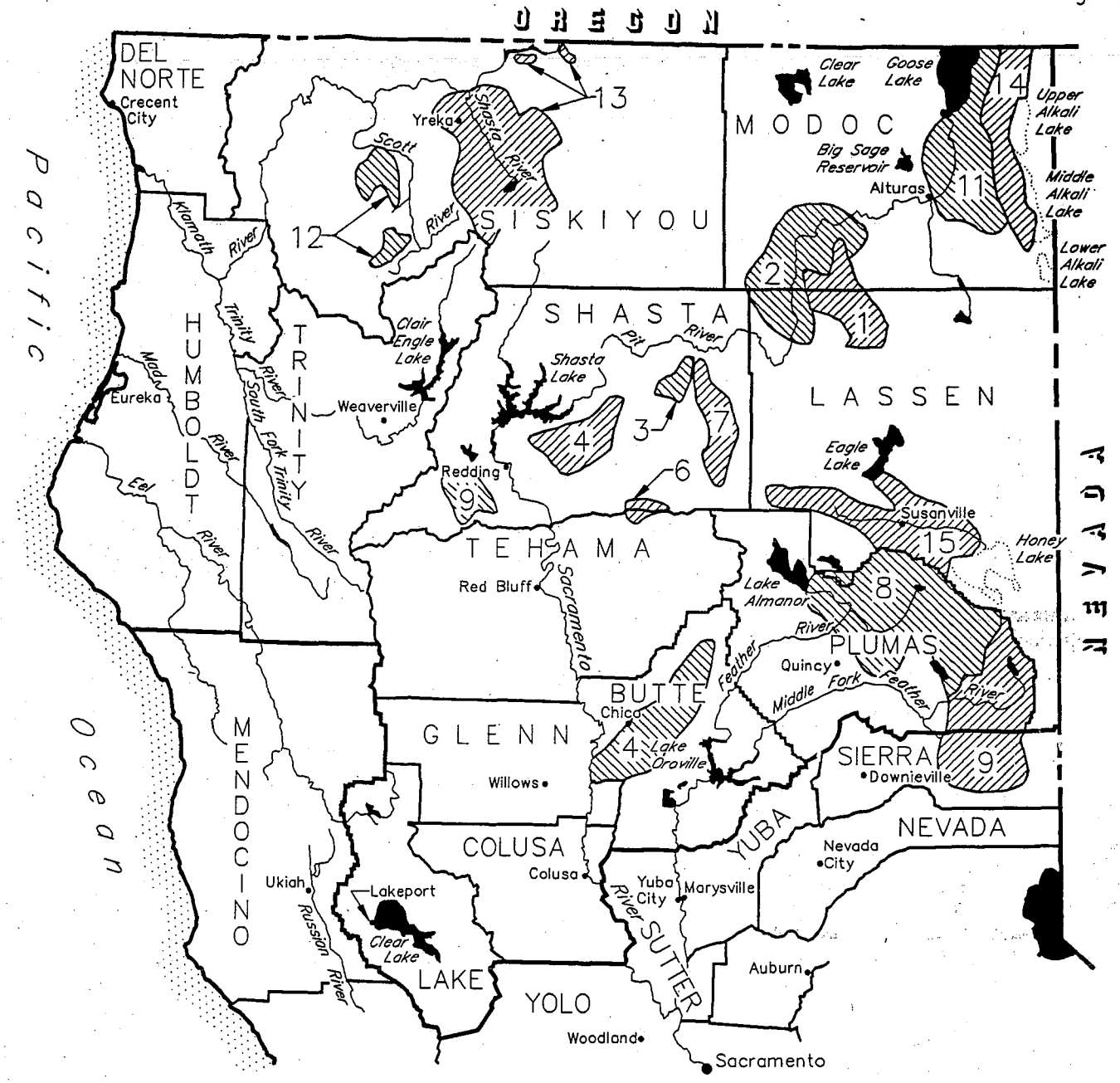
Statutory Adjudications

The California Water Code (Sections 2500-2900) gives a procedure whereby water users of any stream may petition the SWRCB, Division of Water Rights, to make a legal determination of all water rights on that stream. If the Board finds that such a determination is in the best public interest, it proceeds with a legally binding decision. This results in a court decree that defines all water rights on the stream.

Figure 1 contains a location map of the service areas, the number of decreed holders, and the amounts of water rights for each area. Table 1 lists the water right Superior Court decrees and their type.

Watermaster Service Areas

Figure 1



1991 Decreed Water Rights

Service Area	Number of Decreed Water Right Holders	Total Decreed Water Rights ft3/s
1. Ash Creek	47	123.650
2. Big Valley	50	206.780
3. Burney Creek	11	33.090
4. Butte Creek	46	431.840
5. Cow Creek	99	56.562
6. Digger Creek	111	23.401
7. Hat Creek	87	135.716
8. Indian Creek	49	96.715
9. M.F. Feather River	119	376.739
10. N.F. Cottonwood Creek	12	29.050
11. N.F. Pit River	105	216.475
12. Scott River	102	129.560
13. Shasta River	208	623.857 1/
14. Surprise Valley	199	400.970 2/
15. Susan River	228	354.099

1/ Includes Willow Creek near Ager which is based on a percentage of flow.
2/ Includes Pine Creek near Alturas.

TABLE 1

WATERMASTER SERVICE AREAS, STREAM SYSTEMS

AND

SUPERIOR COURT DECREES REGULATING WATER DISTRIBUTION

Watermaster Service Area	Name of Stream System[a/]	County	Decree Number	Decree Date	Decree Type*	Date Watermaster Service Area Created	Remarks
Ash Creek	Ash Creek and Lassen	Modoc **	3670	10-27-47	CR	4-03-59	Included as part of Big Valley service area 1949 through 1958.
Big Valley	Pit River	Modoc ** and Lassen	6395	2-17-59	S	11-13-34	Service provided in accordance with recorded agreement in 1934. Service area operated under recorded agreement 1935 through 1958, and under decree since 1959. Service discontinued on December 31, 1981, and reactivated May 1, 1991.
Burney Creek	Burney Creek	Shasta	5111	1-30-26	CR	9-11-29	Service provided in accordance with decree since 1926.
Butte Creek	Butte Creek	Butte	18917	11-06-42	S	1-07-43	
Cow Creek[b/]	North Cow Creek	Shasta	5804	4-29-32	CR	10-17-32	
	Oak Run Creek	Shasta	5701	7-22-32	CR	10-17-32	
	Clover Creek	Shasta	6904	10-04-37	CR	1-21-38	
Digger Creek	Digger Creek	Shasta and Tehama **	2213	8-12-99	C	6-11-64	
			3214	5-27-13	C		
			3327	10-16-17	C		
			4570	2-24-27	C		
Hat Creek	Hat Creek	Shasta	5724	5-14-24	CR	9-11-29	Service provided in accordance with decree since 1924.
			7858	10-07-35	CR		
Indian Creek	Indian Creek	Plumas	4185	5-19-50	S	2-19-51	
Middle Fork Feather River	Middle Fork Feather River	Plumas ** and Sierra	3095	1-22-40	S	3-29-40	
North Fork Cottonwood Cr.	North Fork Cottonwood Cr.	Shasta	5479	6-09-20	CR	9-11-29	Service provided intermittently in the accordance with the decree since 1924.
North Fork Pit River	North Fork Pit River and all tributaries except Frar klin Creek	Modoc	4074	12-14-39	S	12-18-39	All stream systems consolidated into North Fork Pit River service area 12-13-40.
	New Pine Creek	Modoc	2821	6-14-32	CR	6-22-32	
	Davis Creek	Modoc	2782	6-30-32	CR	7-13-32	
	Franklin Creek	Modoc	3118	9-08-33	CR	9-14-33	
	Cottonwood Creek	Modoc	2344	5-03-40	CR	12-13-40	
Scott River	French Creek	Siskiyou	14478	7-01-58	CR	11-19-68	French, Shackleford, and Wildcat Creek were combined in 1960 to form the Scott River service area. Sniktaw Creek was added on April 1, 1981.
	Shackleford Creek	Siskiyou	13775	4-10-50	S	11-06-50	
	Wildcat Creek	Siskiyou	30662	1-18-80	S	5-01-80	
	Sniktaw Creek	Siskiyou	30662	1-18-80	S	4-01-81	
Selad Creek	Selad Creek	Siskiyou	13774	4-10-50	S	11-06-50	No service provided since 1963.
Shasta River	Shasta River	Siskiyou	7035	12-29-32	S	3-01-33	
	Willow Creek	Siskiyou	24482	6-22-72	C	7-01-72	
	Cold Creek	Siskiyou	29348	7-05-78	S	4-01-81	
Surprise Valley	Cedar Creek	Modoc	1206	5-22-01	C	9-11-29	All adjudicated stream systems in Surprise Valley were consolidated into the Surprise Valley service area on 1-10-39. Bidwell Creek was added on March 16, 1960. Service started on Cedar Creek in 1926 in accordance with the decree. Service was provided on Soldier and Owl Creeks in 1929 in accordance with the decrees by order of the court.
			2343	2-15-23	C		
	Soldier Creek	Modoc	2405	11-28-28	CR	9-11-29	
	Owl Creek	Modoc	2410	4-29-29	CR	9-11-29	
	Emerson Creek	Modoc	2840	3-25-30	CR	4-02-03	
	Mill Creek	Modoc	3024	12-19-31	CR	12-30-31	
	Deer Creek	Modoc	3101	1-25-34	CR	12-29-34	
	Pine Creek near Cedarville	Modoc	3391	12-07-36	CR	1-13-37	
	Rader Creek	Modoc	3628	6-04-37	CR	6-12-37	
	Eagle Creek	Modoc	2304	4-05-26	C	1-10-39	
			3284	11-05-37	CR		
	Pine Creek near Alturas	Modoc	Agreement	11-22-23		1-12-35	Pine Creek was transferred from North Fork Pit River to Surprise Valley Watermaster serice Area in 1988.
	Cottonwood Creek	Modoc	6903	12-01-64	C	7-01-77	
	Bidwell Creek	Modoc	6420	1-13-60	S	3-16-60	
Susan River	Susan River	Lassen	4573	4-18-40	CR	11-10-41	
	Baxter Creek	Lassen	8174	12-15-55	S	2-16-56	
	Parker Creek	Lassen	8175	12-15-55	S	2-16-56	

* Explanation of type of decree:

C - Court adjudication (court makes determination from evidence submitted--no report of referee)
CR - Court reference (referred to State Water Resources Control Board for investigation and report)
S - Statutory adjudication (State Water Resources Control Board is petitioned by water users to make a determination of all water rights on a stream system)

** Decree entered by the Superior Court of this county.

[a/] Major tributaries only; a complete listing is given in "Watermaster Service Areas and Stream Systems", page 6.

[b/] Mainstem Cow Creek not in service area.

Watermaster Service Areas

Watermaster service is provided in areas where the rights have been defined by the superior court of the county, or by agreement, and where an unbiased qualified person is needed to properly apportion the available water according to the established rights. The Director of the Department of Water Resources creates watermaster service areas where these conditions exist, following either a request by the users or an order by the superior court.

The first watermaster service areas were created in September 1929. Before then, some watermaster service was provided in accordance with the Water Commission Act of 1913. There are now about 50 streams in Northern California that are under State watermaster service. The newest service areas were created in 1979.

The counties and principal water sources of the various service areas in Northern California are listed in Table 2.

Of these fifteen areas, thirteen are in the Department's Northern District and two are in the Division of Operation and Maintenance, Oroville Field Division.

Description of Region

The service areas are mainly in the mountainous northeastern part of the State where the growing season varies between about 100 and 140 days. Meadow hay and alfalfa are the principal crops under irrigation, although much land is used exclusively for pasturing livestock. Most irrigation is done by gravity systems, with water users diverting directly from the streams at one or more diversion points. However, pumped diversions and sprinkler irrigation systems are becoming popular in some areas.

Watermaster Responsibilities

To assure the proper distribution of water within the service area, each watermaster must ascertain the amount of water available and distribute it both by amount and priority according to established water rights.

Authority

To accomplish this, the watermaster gets his authority both from Water Code and from provisions of pertinent court decrees or voluntary agreements to physically regulate the streams in the service area. He is further authorized to supervise the design, construction, operation, and maintenance of diversion dams, headgates, and measuring devices.

Each watermaster supervises water distribution at around 100 to 200 diversions in one or more service areas. The need for frequently checking and regulating these diversion points increases substantially in years of short water supply.

TABLE 2

WATERMASTER SERVICE AREAS AND STREAM SYSTEMS

Service Area	County	Principal Water Sources: MAJOR STREAM and Tributaries[a]	Principal Water Sources: Reservoirs and Nontributary Streams
Ash Creek	Lassen, Modoc	ASH CREEK Butte, Rush, and Willow Creeks	
Big Valley	Modoc, Lassen	PIT RIVER Ash Creek	Lower Roberts Reservoir
Burney Creek	Shasta	BURNEY CREEK	
Butte Creek	Butte	BUTTE CREEK	West Branch Feather River
Cow Creek	Shasta	COW CREEK[b] North Cow, Clover, Oak Run, and Cedar Creeks	
Digger Creek	Shasta, Tehama	DIGGER CREEK	
Hat Creek	Shasta	HAT CREEK	
Indian Creek	Plumas	INDIAN CREEK Lights Creek, Wolf Creek	
Middle Fork Feather River	Plumas, Sierra	MIDDLE FORK FEATHER RIVER Little Last Chance, Smithneck, Webber and Fletcher Creeks; Spring Channels; Westside Canal	Little Truckee River
North Fork Cottonwood Creek	Shasta	NORTH FORK COTTONWOOD CREEK	Rainbow Lake
North Fork Pit River	Modoc	NORTH FORK PIT RIVER Parker Creek	Cottonwood, Davis, and New Pine Creek
Scott River	Siskiyou	FRENCH CREEK Shackleford, Mill, Miners, Wildcat, Oro Fino, Sniktaw Creeks	Cliff and Campbell Lakes
Shasta River	Siskiyou	SHASTA RIVER Little Shasta River	Dwinnell Reservoir (Lake Shastina), Cold Creek, Willow Creek
Surprise Valley	Modoc	NONE (All creeks listed at right are unconnected)	Bidwell, Mill, Soldier, Pine near Cedarville, Cedar, Deep, Cottonwood, Owl, Rader, Eagle, Emerson, and Pine Creek near Alturas
Susan River	Lassen	SUSAN RIVER Willow Creek	Lake Leavitt, Hog Flat, McCoy Flat Reservoirs; Baxter and Parker Creeks

[a] Major tributaries only.
[b] Mainstem Cow Creek not in service area.

Control Devices

Permanent measurement and control devices, which the State requires (Water Code Sections 4100-4104) at each property owner's main point of diversion, are constructed by the water users under supervision of the watermaster. Installation of accurate, easily set, and lockable structures is a continuing objective of watermaster service, since once they are built, conflicts among water users usually stop. Also, the watermaster's ability to check and set each diversion regularly is greatly helped by engineered and properly built structures.

Interpretation of Decrees

The watermaster is often called upon to make on-the-spot interpretations of various court decrees, agreements, etc. Since most of these documents were written more than 30 years ago, many situations have developed that were not initially considered. Therefore, watermasters must use sound, careful, and practical judgment in attempting to reach workable solutions to water disputes. To accomplish this, they must possess a good understanding of California water rights law.

Water Supply

Water supply in the watermaster service areas comes mainly from unregulated runoff of small streams. Peak runoff--snowmelt in most cases--occurs in the spring, with relatively small streamflow occurring in the summer and early fall. Additional supplies from storage reservoirs and ground water pumping are used in some areas to supplement natural streamflow, but State watermasters do not supervise the use of ground water in this part of the State.

In some service areas, the water supply must be predicted in advance to determine the date watermastering will begin and, to some extent, the manpower needed. The Department's Bulletin 120 series, "Water Conditions in California," is used to assist in these predictions.

Precipitation

The streamflow available for distribution is affected by total precipitation, amount of snowpack, air temperature, and the amount of rainfall received during the irrigation season. The latter is particularly important in the upper Pit River-Surprise Valley areas, where about 25 to 30 percent of the annual precipitation occurs normally in April, May, and June. Spring storms, which are normally accompanied by relatively cool temperatures, materially affect both the water supply and the demand. Temperatures in the spring affect the demand for water and the manner in which snowmelt runoff occurs. A hot, dry spring depletes the water supply very early, even in years of normal snowpack. A cold, wet spring can extend the supply well into the irrigation season, but cold temperatures retard the growth of crops and are not necessarily desirable.

Table 3 reports the quantity of precipitation at selected stations in the service areas during the 1990-91 water year. The seasonal precipitation gives an indication of the related water supply available for distribution, and provides a basis for comparing the current year's supply with a long-term average.

Table 4 shows the snowpack on April 1, 1991 on all snow courses, and the snowpack on May 1, 1991 on selected courses. This information comes from the Department's basic data files.

Streamflow

The general water supply available for diversion within each watermaster area is determined from stream gaging stations placed at key locations in the main stream channels. Several major stations are installed and maintained by the Department and the U. S. Geological Survey as part of a Federal-State program for collection of year-round streamflow records. In addition, several stream gaging stations are installed and operated by the watermasters during the irrigation season to provide supplemental information. Also, water stage recorders are often installed by watermasters in selected diversion ditches to further assist them in proper distribution of the various water right allotments.

Table 5 presents runoff data at selected stream gaging stations in or near the service areas.

TABLE 3

PRECIPITATION AT SELECTED STATIONS - 1990-91 SEASON

Current Season = in inches
Long-term Average

Station	County	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Percent of Mean
Fort Jones R.S.	Sisk.	0.70 1.39	1.32 2.94	0.79 4.49	1.01 4.77	2.25 2.79	3.35 2.00	1.53 1.08	1.16 0.76	0.63 0.78	0.57 0.34	0.62 0.49	0.08 0.65	14.01 22.48	62
Happy Camp R.S.	Sisk.	1.24 3.67	1.94 7.91	2.36 10.90	3.50 12.18	4.63 7.78	9.32 6.51	2.24 2.78	1.75 1.45	0.80 0.61	1.42 0.25	0.72 0.54	0.00 1.09	29.92 55.67	54
Yreka	Sisk.	0.35 1.25	1.32 2.34	0.64 3.83	1.02 3.68	1.68 2.17	2.87 1.80	0.83 0.89	2.38 0.77	1.28 0.85	1.08 0.40	0.79 0.63	2.15 0.59	16.39 19.20	85
Redding, WSO	Shasta	0.83 2.17	0.67 4.47	0.56 6.61	0.89 7.60	3.97 6.05	9.67 4.99	0.52 2.93	2.13 1.68	0.11 0.84	0.03 0.13	0.00 0.18	0.00 0.80	19.38 38.45	50
Hat Creek P.H. #1	Shasta	0.63 1.23	0.86 2.09	0.60 3.22	0.45 3.24	1.49 2.53	5.63 2.09	1.94 1.22	1.82 1.22	0.22 0.89	1.00 0.21	0.00 0.37	0.18 0.56	14.82 18.87	79
Lookout 3WSW	Lassen	1.05 1.31	1.34 3.27	2.81 3.20	0.46 3.54	1.22 2.46	7.06 2.77	1.72 1.45	3.07 1.35	0.46 1.01	0.91 0.38	0.59 0.53	0.00 0.85	20.69 22.12	94
Alturas R.S.	Modoc	0.25 0.94	1.33 1.31	0.55 1.53	0.53 1.67	0.41 1.23	3.34 1.25	1.43 1.00	2.45 1.21	0.68 1.09	0.07 0.31	0.41 0.43	T 0.48	11.45 12.45	92
Jess Valley	Modoc	0.64 1.38	1.59 1.89	2.06 1.96	1.38 1.99	1.54 1.67	3.42 1.82	3.01 1.80	5.38 2.04	1.01 1.57	0.42 0.48	0.40 0.64	0.30 0.73	21.15 17.97	118
Cedarville	Modoc	0.52 1.18	0.92 1.61	0.51 2.70	0.33 2.02	0.44 1.36	3.39 1.33	1.44 1.02	1.88 1.11	0.66 0.83	0.24 0.37	0.27 0.38	0.09 0.48	10.69 14.39	74
Susanville 1WNW	Lassen	0.29 1.14	1.00 1.43	0.49 2.59	0.24 2.88	0.87 1.93	5.75 1.38	1.19 0.64	1.21 0.75	0.54 0.67	0.44 0.30	1.04 0.22	0.34 0.36	13.40 14.29	94
Greenville R.S.	Plumas	1.11 2.31	1.66 4.64	1.31 7.00	0.59 8.47	1.92 6.25	13.75 4.95	1.23 2.72	1.96 1.59	0.83 0.85	0.03 0.30	0.44 0.46	0.33 0.67	25.16 40.21	63
Sierraville R.S.	Sierra	0.41 1.97	1.25 2.99	0.87 4.73	0.14 2.81	1.39 3.75	8.49 2.90	0.40 1.56	1.27 1.35	0.17 0.60	0.46 0.32	0.83 0.42	0.83 0.52	16.51 23.92	69
Vinton 5SW	Plumas	0.18 0.91	0.41 1.33	0.37 2.15	0.05 2.39	0.96 1.54	4.11 1.26	0.33 0.78	1.06 0.99	0.45 0.64	0.50 0.32	0.83 0.38	0.60 0.37	9.85 13.06	75

NOTE: Current season above line; long-term averages below line.

TABLE 4

SNOWPACK AS OF APRIL 1 AND MAY 1, 1991, AT REPRESENTATIVE SNOW COURSES

Watermaster Service Areas	Snow Course* Group Related to Each Service Area	Calif. I. D. No.	Elevation (in feet)	WATER CONTENT OF SNOW				
				April 1 Average (in inches)	April 1, 1991**		May 1, 1991	
					In inches	In Percent of April 1 Average	In inches	In Percent of April 1 Average
Ash Creek	Blue Lake Ranch	28	6,800	12.6	10.1	80		
Burney Creek	Thousand Lakes	33	6,500	38.1	20.8	55	20.4	54
Butte Creek	Humbug Summit	60	4,850	12.1	9.7	80	0.0	0
	Silver Lake Meadows	45	6,450	30.5	22.4	73	15.1	50
Cow Creek	New Manzanita Lake	343	5,900	8.1	7.0	86	2.1	26
Digger Creek	Burney Springs	41	4,700	2.8	5.6	200		
Hat Creek	New Manzanita Lake	343	5,900	8.1	7.0	86		
Indian Creek	Independence Lake	86	8,450	41.3	28.8	70		
Middle Fork Feather River	Rowland Creek	280	6,700	18.5	12.6	68	8.5	46
	Yuba Pass	74	6,700	31.9	20.4	64	9.6	30
	Mount Dyer No. 1	48	7,100	25.5	19.4	76	15.6	61
North Fork Pit River	Cedar Pass	30	7,100	17.2	14.8	86		
Scott River	Middle Boulder No. 1	5	6,600	31.5	21.0	67	15.7	50
Shasta River	Little Shasta	2	6,200	20.6	9.8	48	15.8	77
	Parks Creek	1	6,700	36.6	24.0	66		
South Fork Pit River	Adin Mountain	35	6,350	13.6	6.3	46	2.9	21
Surprise Valley	Mount Bidwell	78	7,200	24.4	17.1	70		

* Snow courses are listed in order of elevation with each geographical group of watermaster areas.
** Data collected only at stations listed.

TABLE 5

RUNOFF, SELECTED STATIONS - 1990-91 (ACRE-FEET)

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual Total	Long Term Average	Percent of Average
Bidwell Creek near Fort Bidwell	173	228	311	423	301	378	883	2,408	2,834	756	292	180	9,167	18,000	51
Burney Creek at Burney	646	827	NR	NR	NR	3,033	3,235	2,261	756	454	334	311	NR	57,000	NR
Butte Creek near Chico	4,660	5,700	5,500	5,600	6,630	43,790	29,760	22,020	11,260	7,610	4,870	5,180	152,600	297,800	51
Hat Creek near Hat Creek	6,220	6,310	6,400	6,330	5,690	6,420	6,130	7,290	7,600	6,130	5,900	5,550	75,980	103,600	73
Pit River near Canby	2,860	3,960	3,030	5,600	4,710	18,550	11,200	47,310	10,680	2,510	2,010	3,480	115,900	181,800	64
Scott River near Fort Jones	1,900	3,300	4,060	7,360	12,940	23,420	17,590	29,070	15,230	2,520	794	683	118,900	478,200	25
Shasta River near Yreka	6,660	9,470	9,460	9,400	9,470	9,430	3,230	7,590	2,660	2,140	1,350	1,850	72,720	136,200	53
Susan River at Susanville	289	433	262	487	637	2,690	4,870	4,210	687	167	74	91	14,890	67,090	22

SERVICE AREA DESCRIPTIONS AND 1991 WATER SUPPLY STATISTICS

This portion of the report consists of fifteen sections, one for each service area active in 1991, presented in alphabetical order.

Each of these sections presents a description of the particular service area, including location, geography, and general characteristics. Following this is a section entitled "Basis of Service," which includes such data as the case number, date, and type of decrees, a brief summary of the decree or agreement that defines the water rights, the date the service area was created, and other related information.

These service area descriptions also give data on the water supply, methods of distribution, significant events of the watermaster season, and daily streamflow records. The listings of water right holders are updated as of March 1 each year from County Assessors' records.

As in previous years, watermaster service is activated on different dates in the various areas depending upon the streamflow conditions, the ranchers' needs for the water, or, as on some streams, the terms of the decree. Service was continued in all areas through the growing season as long as needed.

The date service was started in each service area and the name of the watermaster in charge are listed on Table 6.

TABLE 6

START-UP DATES AND WATERMASTERS

Service Area	Date Service Began in 1991	Watermaster
Ash Creek	April 1 April 15	John P. Clements George M. Fitzmorris
Big Valley	May 1	John P. Clements
Burney Creek	May 1	John P. Clements
Butte Creek	April 1	John A. Nolan
Cow Creek	May 1	John A. Nolan
Digger Creek	June 1	John A. Nolan
Hat Creek	May 1	John P. Clements
Indian Creek	April 15	Ralph D. Howell
M. F. Feather River	March 15 April 22	Conrad L. Lahr Charles D. Hand
N. F. Cottonwood Creek	June 1	John A. Nolan
N. F. Pit River	April 1 April 15	John P. Clements George M. Fitzmorris
Scott River	April 1 April 15	Keithal B. Dick Lester L. Lighthall
Shasta River	April 1 April 15	Keithal B. Dick Lester L. Lighthall
Surprise Valley	March 19	Kevin L. Dossey
Susan River	March 1	Virgil D. Buechler

ASH CREEK WATERMASTER SERVICE AREA

The Ash Creek service area is in Modoc and Lassen counties near the town of Adin, about 100 miles northeast of Redding via Highway 299E. The major sources of water for the service area are Ash Creek and three tributaries, Willow, Rush and Butte Creeks. Ash Creek rises in Ash Valley in the southeastern part of the service area, and flows northwesterly about 18 miles to its confluence with Rush Creek, then southwesterly to the town of Adin, and then westerly to Ash Creek Swamp and Pit River. Butte and Willow Creeks head in the mountains to the east and flow northwesterly into Big Valley. Butte Creek meets Ash Creek near the head of the Valley at Adin. It meets Willow Creek about 3 miles farther west, near the head of Ash Creek Swamp. The valley floor elevation in this vicinity is about 4,200 feet.

Basis of Service

The rights on this creek system were determined by a court reference and set forth in Decree No. 3670, Modoc County Superior Court, dated October 27, 1947. From 1949 through 1958, Ash Creek was included as a part of Big Valley watermaster service area. The Ash Creek service area has been served separately since April 3, 1959.

About 85 percent of the water rights in the service area are in Big Valley, west of the town of Adin. The rest are along the upstream tributaries and in Ash Valley, east of Adin. The part of Big Valley served is about 10 miles long by 6 miles wide, extending from Adin to the confluence of Ash Creek and the Pit River.

The Ash Creek Decree establishes the number of priority classes on the individual streams within the service area as follows: Ash Creek - five, Willow Creek - four, Rush Creek - one, and Butte Creek - two. Each of these streams is independently regulated.

Water Supply

The water supply for Ash and Rush Creeks comes mainly from snowmelt, since most of the watershed is between 5,000 and 6,000 feet in elevation. Willow Creek and Butte Creek get much of their water from springs. These creeks normally have enough water to satisfy demands until about June 1, after which the supply decreases rapidly. By the end of June, Ash Creek normally has receded to about 20 cubic feet per second (cfs), and Butte Creek to less than 1 cfs. The flow of these creeks then remains nearly constant for the rest of the season. Records of the daily mean discharge of stream gaging station, Ash Creek at Adin, is presented in Table 7. The flow in Willow Creek above Diversion No. 92 and 93 is presented in Table 8.

ASH CREEK WATERMASTER SERVICE AREA

TABLE 7

1991 Daily Mean Discharge
(In cubic feet per second)

ASH CREEK AT ADIN

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	38	89	239	49	27	26	25
2	40	83	319	41	25	27	19
3	59	76	214	36	25	27	19
4	461	71	147	33	23	25	19
5	300	68	119	32	19	27	20
6	NR	114	104	31	17	26	20
7	NR	106	94	30	21	26	20
8	NR	82	93	26	26	27	20
9	NR	69	93	16	26E	26	23
10	NR	59	89	13	25E	28	18
11	NR	56	85	15	24E	30	17
12	NR	54	83	16	23E	30	19
13	NR	53	96	12	22E	31	21
14	NR	56	116	13	21E	32	22
15	NR	62	89	19	20	33	19
16	NR	65	85	14	20E	35	18
17	NR	66	162	17	20E	35	18
18	NR	71	353	23	21E	35	19
19	NR	67	672	26	21E	33	19
20	NR	69	821	26	22E	28	20
21	NR	69	437	26	23E	24	21
22	NR	73	307	22	24E	24	21
23	81	78	217	21	24E	26	22
24	78	75	151	23	25E	26	22
25	87	97	111	24	25E	27	24
26	91	114	88	34	26E	29	24
27	86	90	70	25	26E	30	26
28	82	81	63	21	26E	31	28
29	84	78	56	22	26	31	21
30	88	74	75	26	26	31	22
31	92		64		25	30	
MEAN	NR	75.5	184	24.4	23.4E	28.9	20.9
AC-FT	NR	4493	11330	1452	1436E	1777	1242

NR - No Record
E - Estimated

ASH CREEK WATERMASTER SERVICE AREA

TABLE 8

1991 Daily Mean Discharge
(In cubic feet per second)

WILLOW CREEK ABOVE DIVERSIONS 92 AND 93

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		8.6[1/]	11	12	5.9	3.9	4.1
2		8.2	13	11	5.6	4.1	4.1
3		8.0	16	10	5.3	3.9	3.9
4		7.3	12	9.6	5.1	3.9	3.9
5		7.1	10	9.2	4.9	4.1	4.1
6		7.3	9.2	8.6	4.6	3.9	4.1
7		7.7	8.8	7.7	4.6	4.1	3.9
8		7.3	8.6	7.3	4.4	3.9	4.1
9		7.3	8.0	7.1	4.1	3.7	4.1
10		7.1	8.0	6.9	4.4	3.9	4.1
11		6.9	7.7	6.6	4.4	3.9	4.4
12		6.9	7.3	6.3	4.1	3.9	4.6
13		6.6	8.8	6.3	4.1	3.7	4.4
14		6.6	8.8	6.3	4.1	3.9	4.4
15		8.2	8.6	6.6	4.1	4.4	4.4
16		8.6	10	6.3	4.1	4.1	4.1
17		8.0	19	6.3	4.4	3.9	4.1
18		8.2	38	6.1	4.4	3.7	4.1
19		8.8	48	6.1	4.4	3.7	4.1
20		9.2	60	6.3	23	3.7	3.9
21		8.8	53	6.1	11	3.7	3.9
22		8.6	43	5.9	4.9	3.9	4.1
23		8.0	33	6.1	4.9	3.7	4.1
24		8.2	23	6.1	4.4	3.9	4.1
25		8.6	21	6.3	4.1	3.9	3.9
26		8.8	18	6.3	4.1	3.7	4.1
27		8.0	16	6.3	3.9	3.7	4.4
28		7.7	14	6.3	3.9	3.7	4.1
29		7.1	13	6.6	3.7	3.9	4.1
30		6.9	19	6.1	3.9	3.9	4.4
31			13		3.9	3.9	
MEAN		7.8	18.9	7.2	5.2	3.9	4.1
AC-FT		465	1164	426	323	238	246

[1/] No record before April 1.

Method of Distribution

Irrigation from Ash Creek and its tributaries uses numerous small dams to divert flow into systems of ditches. The ditches deliver the water to the various fields for spreading. Wild flooding is the method most used, but some ranchers have checks and ditches and some use pumps to operate sprinklers or to lift water to higher spreading ditches. In some cases, runoff water is captured and reused before it returns to the stream.

A wet spring and heavy storms during mid-May improved the water supply for Ash Creek and its tributaries from the flows that were forecast.

1991 Distribution

Watermaster service began in the Ash Creek watermaster service area on April 1 and continued until September 30. John P. Clements, Associate Engineer, Water Resources, served as watermaster from April 1 through 14. George M. Fitzmorris, Assistant Engineer, Water Resources, served as watermaster from April 15 through September 30.

Ash Creek

Full third priority water was available during May and June. The flow then decreased to the second priority level. Full second priority water was available for the remainder of the irrigation season.

At the request of Robert Akers, the following Public Utility water was furnished him: June 9 through 23, 40 ac-ft, September 1 through 15, 81 ac-ft. From August 1 through 15, the other specified Public Utility water dates, water totaling 48 ac-ft was furnished him from the Big Valley Drain. The Akers farm was on a spring and fall crop scheme and chose not to use the August water. The August water was available due to haying operations which were underway in the Ash Creek Swamp.

Butte Creek

Full priority water was available during May and June. The flow then decreased to about 50 percent of 1st priority and remained fairly uniform for the rest of the season.

Rush Creek

Full priority water was available during May and June. The flow decreased to about 50 percent of the priority in July and remained fairly constant for the remainder of the season.

Willow Creek

During the spring runoff, third and then fourth priority water was available in May. The flow decreased to third priority and then to second priority in early June. The flow decreased further to about 50 percent of second priority in early July and remained constant for most of the rest of the irrigation season. The flow was back above the fourth priority level for a few days in mid-July because of heavy rain storms.

BIG VALLEY WATERMASTER SERVICE AREA

The Big Valley service area is in Modoc and Lassen counties in the vicinity of the towns of Lookout and Bieber, about 90 miles northeast of Redding via State Route 299.

The Pit River is the major source of water regulated by the watermaster. The river enters the valley north of the town of Lookout and flows southerly through the western part of the valley and out at the southern end. The major area of use is along approximately 13 miles of valley floor, up to 6 miles wide, along the Pit River at an approximate elevation of 4,200 feet.

Basis of Service

The Big Valley watermaster service area was created on November 13, 1934, and service began with the 1935 season, operating under an agreement to determine water rights recorded in 1934. The water rights in this service area were set forth in Decree No. 6395, Modoc County Superior Court, a statutory decree, dated February 17, 1959.

Distributing the water on a continuous flow basis, as provided by the decree, has proven impracticable to the users who employ wild flooding or border irrigation practices because of the wide variation of flows. By mutual agreement, an alternative procedure allowing each user a definite amount of water in acre-feet for each cubic foot per second of right allocated by the decree has been adopted. The watermaster estimates the amount of water probably available for the next 15 to 30 days and chooses the appropriate ac-ft/cfs ratio with a view to completing the rotation through the valley in not more than 30 days.

The irrigators using pumps and sprinklers have elected to receive their water on a more or less continuous flow basis. Over the years, different ways have been employed to insure that applications of small amounts over extended periods result in no advantage over the flooders who use large amounts for very short periods.

Water Supply

The flow in the Pit River at the head of Big Valley is mostly from direct runoff, mainly snowmelt, and return flow from irrigation water released from West Valley and Big Sage Reservoirs above South Fork Pit River and Hot Springs Irrigation District, respectively.

The available water supply in the Pit River as it flows through Big Valley used to be adequate to satisfy all demands until about June 1. The irrigation practices in Hot Springs Irrigation District, about 20 miles upstream from Big Valley, have a significant effect on the available water supply in Big Valley. Water users in Hot Springs Irrigation District divert most of the flow of the

Pit River for two- or three-week periods. In recent years, Hot Springs Irrigation District has improved the use and coordinated the distribution of their water, so releases from their system are less than they were 10 years ago. However, Big Valley Irrigation District water users are unable to keep much stock water in August and September.

Several users, who irrigate crops by sprinkling, have drilled wells to supplement their water supply. Some of these are several miles upstream from the place of use, and the Pit River is used to convey it downstream to where it is pumped out. The users who irrigate by flooding have not changed nor improved their practices.

Roberts Reservoir, which stores runoff of a minor tributary to the Pit River near the upper end of Big Valley above Lookout, serves as a supplemental source of water to those users in the area who are members of the Big Valley Mutual Water Company. Water from this reservoir is released into the Pit River and distributed to members of the water company along with the natural flow to which they are entitled.

The daily mean discharge of the Pit River near Canby stream gaging station is presented in Table 9, page 22.

Method of Distribution

Most water users in the Big Valley service area irrigate on a rotation schedule either by wild flooding or by checks and borders. Large flashboard dams placed in the channel make it possible to use the large heads of water characteristic of the supply in the area. In addition, some pumps are used for diversion, both in ditches and directly into sprinkler systems. The ranches which irrigate by wild flooding must use large heads of water in order to cover unleveled or high ground. Some of the runoff is recaptured for use by downstream lands.

1991 Distribution

Water master service in Big Valley began on May 1 and continued through September 30, with John P. Clements, Associate Engineer, as watermaster.

The water supply from the Pit River for the Big Valley area during the 1991 season was the greatest that has occurred in at least the last five years. A heavy rain and snow storm occurred in the upper Pit River basin in the latter part of May which resulted in a flow of 2,270 cfs at Canby on May 24. Regulation of the flow by the watermaster did not begin until the Gerig and Kramer dams were installed on June 11. A full irrigation rotation among the flood irrigators was initiated at this time. During the period the Gerig and Kramer ranches were haying, another full irrigation was accomplished for the other users who flood irrigate but do not hay. By the latter part of July, when the Kramer and Gerig ranches had completed their haying operations, the flow of the Pit River had decreased substantially and a rotation based on 5.0 acre-foot per one cfs of second priority water right was enforced. This coincided with the release of 25 acre-feet per share from Robert's Reservoir

for a total release of 500 acre-feet. In mid-August, the flow of the Pit River increased and a 10.0 acre-feet per one cfs rotation was initiated. Additional increases in the flow of the Pit River allowed a full irrigation rotation beginning the second week in September.

The water users who pump from the Pit River divert on a continuous flow basis. Due to ample water supply and the installation of flow meters by most of the users, regulation of the users who pump their water allotment did not present a major problem as has been experienced in previous years.

BIG VALLEY WATERMASTER SERVICE AREA

TABLE 9

1991 Daily Mean Discharge
(In cubic feet per second)

PIT RIVER NEAR CANBY[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	51	168	228	433	123	16	17
2	61	159	308	383	138	14	18
3	143	140	505	359	103	13	22
4	514	97	696	374	80	12	29
5	1140	103	495	368	65	19	36
6	1250	113	326	309	53	18	63
7	669	184	262	253	41	12	66
8	352	206	204	259	41	8.4	82
9	253	158	208	205	36	8.3	47
10	183	133	207	91	31	7.1	70
11	148	106	186	125	34	6.1	58
12	138	90	176	94	36	8.2	52
13	153	69	159	82	31	7.8	48
14	204	67	245	114	25	6.8	58
15	266	69	482	108	21	11	82
16	264	53	444	125	14	31	89
17	231	109	333	141	11	66	86
18	214	127	486	183	8.6	78	87
19	232	111	865	140	7.9	60	92
20	281	111	1260	57	7.9	65	81
21	310	106	1670	67	5.5	71	71
22	265	145	2000	111	19	59	65
23	211	223	2230	115	38	80	64
24	200	381	2270	84	54	78	64
25	220	373	2050	64	51	65	59
26	289	407	1690	68	51	56	58
27	357	508	1320	144	41	43	47
28	235	469	958	182	31	32	51
29	160	365	647	195	32	26	50
30	181	299	455	151	19	20	40
31	176		489		18	16	
MEAN	302	188	769	179	40.9	32.7	58.4
AC-FT	18550	11200	47310	10680	2510	2010	3480

[1/] USGS station.

BURNEY CREEK WATERMASTER SERVICE AREA

The Burney Creek service area is in eastern Shasta County above and below the town of Burney. The source of water for this service area is Burney Creek, which enters the southern part of the service area and flows through Burney in a northerly direction to the Pit River. The part of the valley served by this stream is about 11 miles long and 2 miles wide and extends both north and south of Burney.

Basis of Service

The rights on this creek system were determined by a court reference and set forth in Decree No. 5111, Shasta County Superior Court, dated January 30, 1926. Watermaster service was provided on the creek from 1926 to 1929 under the Water Commission Act of 1913. The present service area was created on September 11, 1929.

The Burney Creek decree sets forth a rotation schedule of distribution. The water users, however, have found it more beneficial to irrigate on a continuous-flow basis (one priority class plus surplus allotments), which is now normal practice. The water allotted to the Greer-Cornaz Ditch is distributed according to supplemental court decrees.

Water Supply

The water supply for Burney Creek comes from springs and snowmelt. Most of the watershed lies between the elevations of 4,000 and 7,500 on the northwest slopes of Burney Mountain. The creek normally has enough water for all demands until about the middle of June. The supply then gradually decreases until the end of July. For the rest of the irrigation season, runoff from perennial springs keeps the flow nearly constant at about 40 percent of allotments.

The daily mean discharge of Burney Creek near Burney is presented in Table 10. The stream gaging station on Burney Creek is downstream from four points of diversion, so the records do not show all of the available water supply of the creek.

Method of Distribution

Water is diverted from Burney Creek, in most cases, by means of low diversion dams into ditches that convey it to the individual users. Some users are still using flood irrigation, while some of the lower users are pressurizing the water with low lift pumps and sprinkler irrigation.

BURNEY CREEK WATERMASTER SERVICE AREA

TABLE 10

1991 Daily Mean Discharge
(In cubic feet per second)

BURNEY CREEK NEAR BURNEY

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	19	42	38	22	9.3	6.2	5.3
2	43	45	36	21	8.9	5.9	5.3
3	131	55	38	19	8.4	5.7	5.2
4	253E	59	35	18	8.0	5.7	5.2
5	138	72	34	16	7.4	5.8	5.1
6	56	168	35	16	7.5	5.8	5.0
7	38	105	34	15	7.5	5.7	5.0
8	30	71	42	14	7.6	5.5	5.6
9	26	59	40	14	7.5	5.4	5.6
10	28	52	35	13	7.5	5.3	5.6
11	28	45	33	12	7.4	5.2	5.2
12	28	40	30	12	7.3	5.1	5.2
13	29	38	41	11	7.0	5.1	5.2
14	29	37	42	11	7.0	5.3	5.2
15	29	48	34	11	7.1	5.2	5.2
16	29	49	35	10	7.2	5.2	5.2
17	30	48	57	11	7.2	5.2	5.2
18	35	48	71	11	7.1	5.2	5.2
19	38	44	59	11	7.1	5.2	5.2
20	39	41	50	11	8.1	5.2	5.2
21	36	41	44	11	9.0	5.2	5.2
22	34	38	38	10	7.6	5.2	5.2
23	59	42	34	10	7.3	5.4	5.2
24	55	57	31	9.9	6.9	5.3	5.2
25	45	64	28	9.9	6.9	5.4	5.2
26	43	56	25	9.9	6.9	5.5	5.2
27	38	48	23	9.9	6.8	5.5	5.2
28	35	42	22	11	6.5	5.7	5.2
29	34	39	22	11	6.3	5.6	5.2
30	35	38	29	9.8	6.3	5.5	5.2
31	39		25		6.3	5.4	
MEAN	49.3	54.4	36.8	12.7	7.4	5.4	5.2
AC-FT	3033	3235	2261	756	454	334	311

E - Estimated

1991 Distribution

Watermaster service on Burney Creek began on May 1 and continued through September 30, with John P. Clements, Associate Engineer, Water Resources, as watermaster.

The flow of Burney Creek was ample to supply 100 percent of the first priority water rights through the month of May. Eighty percent was available for most of the month of June, but my mid-July only 60 percent was available. The flow continued to drop and by August 1 only 40 percent was available but remained stable for the remainder of the season.

BUTTE CREEK WATERMASTER SERVICE AREA

The Butte Creek service area is in Butte County a few miles southeast of the City of Chico. The watermaster service area runs about 11 miles along Butte Creek, starting about 4 miles east of Chico and running downstream to the crossing of the Western Canal. It contains about 20,000 acres of valley floor lands at an average elevation of 150 feet.

Basis of Service

The rights on this stream system were determined by a statutory adjudication and set forth in Decree No. 18917, Butte County Superior Court, dated November 6, 1942. The Butte Creek watermaster service area was created on January 7, 1943.

The Butte Creek decree established three priority classes for summer use under Schedule 7, a surplus class inferior to the above rights, and a special class for Hamlin Slough. Schedule 3 of the decree defines the rights for rediversion (Diversion 50) of foreign water delivered into Butte Creek from the West Branch of the Feather River.

On September 18, 1969, the Water Resources Control Board granted permits for the following applications to take water from Butte Creek: application 22321, Gorrill Land Company; 22534, Garrison Patrick; and 22564, Louis C. Camenzind, Jr. These appropriative rights are also under control of the watermaster.

Water Supply

Butte Creek, the major source of water, drains about 150 square miles of the western slope of the Sierra Nevada in the northeasterly part of Butte County above the watermaster service area. The highest elevation in the watershed is about 7,000 feet.

Normally, snowmelt produces sustained high flows in the creek until about the end of June, after which perennial springs above Diversion 50 continue to produce flows of more than 40 cfs. Additional water is imported for distribution from the West Branch Feather River by means of the Hendricks (Toadtown) Canal through De Sabla Reservoir and Powerhouse into Butte Creek.

Records of the daily mean discharge at stream gaging stations in the Butte Creek service area are presented in Tables 11, 12, and 13.

BUTTE CREEK WATERMASTER SERVICE AREA

TABLE 11

1991 Daily Mean Discharge
(In cubic feet per second)

BUTTE CREEK NEAR CHICO[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	416	585	380	289	122	134	130
2	642	519	370	288	107	136	110
3	2140	497	365	285	101	136	108
4	3030	492	360	276	97	136	106
5	1300	525	355	247	93	89	112
6	671	1150	350	257	90	73	110
7	485	800	345	247	88	71	109
8	390	600	355	240	87	70	111
9	348	560	385	234	99	70	107
10	367	530	360	232	108	69	108
11	358	510	345	231	115	69	104
12	551	480	335	218	115	68	103
13	1200	470	335	212	117	69	102
14	568	460	400	194	120	70	98
15	470	450	350	178	124	72	101
16	387	445	330	169	134	70	100
17	350	440	400	161	147	71	99
18	443	420	440	155	135	68	89
19	409	400	420	146	141	68	66
20	669	400	380	141	141	68	60
21	490	420	370	133	142	68	59
22	378	410	360	126	146	64	58
23	515	440	355	124	148	64	59
24	804	460	362	121	148	65	54
25	870	400	358	116	142	63	53
26	1030	480	347	115	141	63	55
27	694	450	338	115	143	63	61
28	534	420	318	122	143	63	62
29	486	400	316	161	132	67	59
30	507	390	316	142	132	70	60
31	575		310		139	128	
MEAN	712	500	358	189	124	79.1	87.1
AC-FT	43790	29760	22020	11260	7610	4870	5180

1/ USGS station.

BUTTE CREEK WATERMASTER SERVICE AREA

TABLE 12

1991 Daily Mean Discharge
(In cubic feet per second)

BUTTE CREEK NEAR DURHAM

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	481	570	290	144	40	14	12
2	692	513	249	140	34	14	12
3	2340	480	203	139	21	10	11
4	2910	475	192	131	15	9.6	9.6
5	1400	501	200	126	13	7.0	8.2
6	707	1030	202	123	10	5.5	6.5
7	491	923	191	112	9.6	5.6	6.8
8	379	676	199	102	11	5.5	8.1
9	326	562	187	100	12	5.5	11
10	335	528	191	96	19	5.7	11
11	336	474	169	87	22	5.8	8.2
12	482	436	158	73	20	5.9	7.9
13	1350	421	195	70	21	5.6	8.8
14	637	442	204	59	22	5.9	9.4
15	511	452	181	49	25	6.9	8.9
16	375	420	187	47	28	6.8	12
17	339	387	303	45	25	5.6	11
18	440	367	258	40	21	5.5	13
19	381	356	242	39	21	6.9	8.3
20	670	385	276	37	21	6.6	6.7
21	481	391	273	32	21	5.5	5.8
22	352	331	288	29	22	5.6	5.8
23	485	346	280	29	22	5.5	6.1
24	865	375	276	29	23	5.5	7.8
25	918	417	257	34	19	5.6	8.4
26	1170	384	239	42	18	7.6	8.3
27	828	337	211	31	20	7.4	8.4
28	591	321	196	28	21	6.3	8.8
29	502	327	167	62	18	6.5	11
30	502	329	176	47	20	6.1	9.1
31	561		160		18	8.4	
MEAN	738	465	219	70.7	20.4	6.9	9.0
AC-FT	45360	27680	13490	4209	1255	424	535

BUTTE CREEK WATERMASTER SERVICE AREA

TABLE 13

1991 Daily Mean Discharge
(In cubic feet per second)

TOADTOWN CANAL ABOVE BUTTE CANAL

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		102[1/]	111	113	40	63	65
2		109	110	113	34	63	63
3		108	112	111	30	63	62
4		108	111	112	30	62	60
5		109	112	112	27	0	66
6		107	112	112	22	0	65
7		116	112	112	20	0	63
8		110	112	112	47	0	63
9		113	111	112	56	0	62
10		110	112	113	54	0	55
11		112	112	114	55	0	56
12		114	112	111	58	0	55
13		110	113	103	62	0	55
14		110	112	91	63	0	56
15		109	112	79	75	0	55
16		111	112	73	76	0	56
17		111	106	65	75	0	56
18		110	112	65	75	0	53
19		111	114	59	75	0	12
20		111	114	57	74	0	12
21		111	112	49	73	0	12
22		111	113	49	73	0	11
23		111	112	44	72	0	4.4
24		111	113	43	71	0	4.0
25		111	112	40	70	0	8.0
26		112	112	40	70	0	8.0
27		110	112	37	66	0	10
28		113	113	41	66	0	10
29		111	113	66	65	0	14
30		110	114	52	65	64	11
31			114		65	63	
MEAN		110	112	80.0	58	12	39.4
AC-FT		6569	6890	4760	3578	750	2345

[1/] No record before April 1.

Method of Distribution

Water is diverted from Butte Creek by pumping and by gravity diversions. Parrott Investment Company, M & T, Inc., Dayton Mutual Water Company, and Durham Mutual Water Company divert relatively large amounts of water by gravity into ditches leading to their individual distribution systems. Various methods of irrigation are in general practice, including contour checks, strip or border checks, basin checks, furrows, wild flooding, and sprinklers. The use of sprinklers has increased in the past few years, especially for orchards.

1991 Distribution

Watermaster service began April 1 in the Butte Creek service area and continued until September 30 with John A. Nolan, Water Resources Engineering Associate, as watermaster.

The water supply for the 1991 irrigation season was about normal. It would have been much below normal except for major storms during the month of March which improved the water supply for the irrigation season. The appropriative rights that are in addition to the Butte Creek decree were partially filled until mid-June, at which time the rice fields were flooded. During the third week in July the Adams Esquon Ranch closed its diversion gates for the remainder of the season and irrigated with well water for the balance of the season.

COW CREEK WATERMASTER SERVICE AREA

The Cow Creek service area is in central Shasta County in the foothills east of Redding. Water for this service area comes from three major creek systems. They are North Cow Creek (sometimes referred to as Little Cow Creek), Oak Run Creek, and Clover Creek. These creeks flow westerly to their confluence in the Millville-Palo Cedro area, then south to the Sacramento River east of the City of Anderson. The service area is generally a narrow strip of land on both sides of each of these creeks. In some cases, water is exported from one creek to the other.

Basis of Service

The water rights on each of these creek systems were determined by court references and set forth in separate decrees. Water rights for these creeks were set forth by Shasta County Superior Court decrees as follows:

Creek	Decree No.	Date
North Cow	5804	April 29, 1932
Oak Run	5701	July 22, 1932
Clover	6904	October 4, 1937

The North Cow Creek decree which includes Cedar Creek, sets forth a rotation schedule of distribution. The water users, however, have found it more beneficial to irrigate on a continuous-flow basis, which is now normal practice. Only one priority allotment was provided in each of the Cow Creek service area decrees, except for the Oak Run Creek decree, which contains a surplus allotment.

The Cow Creek watermaster service area was originally created on October 17, 1932, including North Cow Creek and Oak Run Creek water rights. On January 21, 1938, the service area was expanded to include the Clover Creek rights.

Water Supply

Water for this service area comes mostly from springs and seepage, with some early snowmelt runoff. The watershed varies in elevation from 500 to 5,000 feet and consists mainly of low, brushy hills that do not accumulate a heavy snowpack. Relatively large amounts of precipitation during the winter normally produce substantial seepage and springs that flow through the irrigation season. The creeks normally have sufficient water to supply all demands until late July. The supply then gradually decreases to an average of about 60 to 70 percent of allotments by around mid-September.

The daily mean discharge of North Cow Creek near Ingot is presented in Table 14. The stream gaging station on North Cow Creek is downstream of

COW CREEK WATERMASTER SERVICE AREA

TABLE 14

1990 Daily Mean Discharge
(In cubic feet per second)

NORTH COW CREEK NEAR INGOT

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1				37	12	10	8.6
2				33	13	9.8	8.5
3				33	12	9.7	8.5
4				31	13	9.5	8.4
5				30	12	9.5	8.6
6				28	11	9.3	8.7
7				27	12	9.2	8.6
8				26	12	9.3	8.7
9				26	12	9.4	8.9
10				24	11	9.2	9.1
11				23	10	9.1	9.3
12				22	11	9.2	9.0
13				20	10	9.3	8.8
14				18	11	9.2	8.9
15				16	10	9.2	8.9
16			48[1/]	14	9.7	9.1	9.0
17			53	15	9.5	9.2	9.1
18			55	14	9.1	9.1	9.0
19			53	14	8.7	9.1	8.9
20			52	15	8.5	9.1	8.8
21			50	14	8.3	9.3	8.8
22			47	13	8.2	9.2	8.7
23			45	14	8.1	9.1	8.8
24			44	13	8.0	9.3	8.7
25			42	13	8.3	9.1	8.6
26			40	13	8.8	9.0	8.6
27			39	12	9.1	8.9	8.4
28			39	13	9.5	8.8	8.5
29			40	12	9.7	8.9	8.5
30			41	13	9.8	8.8	8.5
31			40		10	8.8	
MEAN			45	20	9.9	9.2	8.7
AC-FT			1444	1182	610	567	520

[1/] No record before May 16.

many of the diversions and is used by the watermaster, mainly to indicate changes in flow conditions rather than amounts of water available. Consequently, the records do not show all the available water supply of the creek.

Method of Distribution

Water is diverted from the creeks, in most cases by means of low diversion dams, into ditches that convey it to the place of use. Lateral ditches are then used to spread it over the land. Irrigation has been on a continuous-flow basis instead of by rotation since 1934.

1991 Distribution

Watermaster service for North Cow Creek began on May 1 and continued through October 30 with John A. Nolan, Water Resources Engineering Associate, as watermaster.

Cedar Creek

The flow in Cedar Creek was adequate to supply all demands throughout the season.

Clover Creek

The flow was adequate to supply 100 percent of the one priority through the middle of June. It slowly dropped to 50 percent by August 1, where it stayed for the remainder of the irrigation season.

North Cow Creek

The flow was adequate to supply 100 percent of the one priority through the first week in August. It dropped rapidly to a low of 50 percent by August 10. After some major cuts to upstream diversions the water available for the lower users was maintained at 50 percent of their allotments for the remainder of the irrigation season.

Oak Run Creek

The flow was adequate to supply 100 percent of first priority for the entire irrigation season.

DIGGER CREEK WATERMASTER SERVICE AREA

The Digger Creek service area is situated in southeastern Shasta County and northeastern Tehama County.

Digger Creek forms part of the boundary between Shasta and Tehama counties. It drains about 45 miles on the western slopes of the Sierra, just west of Lassen National Park. The creek flows west through the town of Manton to its confluence with North Fork Battle Creek. Manton, the only community in the area, lies about 40 miles northeast of Red Bluff.

Basis of Service

The rights to use of the waters of Digger Creek were determined by four court adjudications. The Crooker Ditch, now combined with the Harrison Ditch, may divert all the water in the creek at its point of diversion. Diversions below this point, though defined by decree, are not in the service area.

Four Tehama County Superior Court decrees define the rights included in the service area. These decrees are listed in Table 15.

TABLE 15

DECREES DEFINING DIGGER CREEK WATER RIGHTS

Case	Decree No.	Date Entered
Gransbury v Edwards	2213	August 12, 1899
Wells v Pritchard	2114	May 27, 1913
Harrison et al v Kaler et al	3327	October 16, 1917
Herrick v Forward	4570	February 24, 1927

The four decrees have, in effect, divided the water rights on the creek into two groups, the upper users and the lower users. The three upper users irrigate land alongside the stream so that all run-off water returns to Digger Creek. The lower users are located within a 5-square-mile area. Very little runoff from the lower users returns to the creek.

The water rights of the three upper users are absolute and not related to those of lower users; therefore, allotments are not cut proportionally as Digger Creek flows decrease. Since the lower users have to stand all deficiencies, the upper users, in effect, have first priority allotments and the lower users have second and third priority allotments.

Water Supply

Snowmelt contributes to the early runoff, but the summer streamflow is primarily from springs. In average runoff years, there is sufficient flow in Digger Creek, with careful regulation, to satisfy all decreed allotments throughout the irrigation season, but serious deficiencies occur in dry years.

Method of Distribution

Irrigation is done mainly by wild flooding, although border checks and sprinklers are used on a few fields. Small diversion dams are placed in the stream channel to divert water into ditches for conveyance to the fields.

1991 Distribution

Watermaster service on Digger Creek began on June 1 and continued until September 30 with John A. Nolan, Water Resources Engineering Associate, as watermaster.

Above normal precipitation occurred during the month of March, and improved the available water supply. The flow in Digger Creek provided 100 percent of all allotments until the end of July. The Crooker lateral declined to about 50 percent of third priority during August and September.

HAT CREEK WATERMASTER SERVICE AREA

The Hat Creek service area is in the eastern part of Shasta County, north of Lassen Volcanic Park. Hat Creek, which flows north through the area, is the only source of water in the service area. The place of use is Hat Creek Valley, which is about 20 miles long and 2 miles wide, running north from about 3 miles south of the town of Old Station to the confluence with Rising River. The irrigatable lands, which consist primarily of volcanic ash, are interlaced with large volcanic rock outcropping.

Basis of Service

Hat Creek water is distributed under provisions of court reference adjudications which resulted in Decree No. 5724, dated May 14, 1924, and Decree No. 7858, dated May 7, 1935, Shasta Superior Court. Decree No. 5724 established irrigation and nonirrigation allotments for 18 periods of rotation between "upper" and "lower" user groups from May 1 to October 28 annually. Decree No. 7858 established three additional water right allotments for continuous irrigation, May 1 through October 28, and allotments for October 28 to May 1 annually for all users. These latter rights are not normally supervised by the watermaster.

Watermaster service in the Hat Creek area has been provided in accordance with the decree since 1924. The existing service area was created on September 11, 1929.

Decree No. 5724 defines the allotments in the separate schedules: upper and lower users, requiring 10-day rotations beginning at 6 a.m., May 1, and ending at 6 a.m., October 28. All water rights have the same priority, with the surplus flows distributed according to the users that are on rotation. The upper users' water rights require 154.7 cfs and lower users require 166.5 cfs. The lower users require more because of additional channel loss. When the upper users are being served, the lower users receive a minimum flow for stock water.

Water Supply

The water supply for Hat Creek comes from snowmelt runoff from Lassen Peak and from large springs. Snowmelt creates a high flow during May and June, but most of the summer supply comes from large springs that decrease only slightly in output. Only after a series of dry years does the flow of these springs decrease below 75 percent of total allotments. Records of mean daily discharge of Hat Creek near Hat Creek are in Table 16.

HAT CREEK WATERMASTER SERVICE AREA

TABLE 16

1991 Daily Mean Discharge
(In cubic feet per second)

HAT CREEK NEAR HAT CREEK[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	102	104	101	126	104	100	91
2	102	104	106	135	103	100	91
3	104	104	104	144	102	100	91
4	124	104	106	145	100	100	91
5	120	106	109	136	99	100	91
6	109	120	111	131	98	100	91
7	106	110	114	131	98	100	91
8	105	107	123	136	97	99	94
9	105	106	121	139	97	95	97
10	104	106	114	150	101	92	97
11	102	105	105	158	103	92	97
12	104	104	100	158	102	92	97
13	102	104	105	150	102	92	98
14	102	105	104	139	103	92	97
15	102	107	107	134	102	93	97
16	101	105	116	132	103	93	97
17	103	104	121	130	103	92	97
18	103	103	115	127	102	91	93
19	104	103	108	126	103	95	91
20	104	104	108	118	104	98	91
21	103	103	115	113	103	98	90
22	103	104	124	111	98	98	90
23	103	99	136	109	98	98	91
24	100	98	145	108	96	98	90
25	102	98	146	108	95	98	90
26	102	96	143	106	95	98	90
27	102	95	136	105	94	97	90
28	102	93	136	110	94	97	95
29	103	95	138	111	93	94	97
30	104	96	135	106	97	91	97
31	105		122		100	92	
MEAN	104	103	119	128	99.6	96.0	93.3
AC-FT	6420	6130	7290	7600	6130	5900	5550

1/ USGS station.

Method of Distribution

Most irrigation in the area is done by wild flooding. Large heads of water are used to cover the land rapidly, thereby preventing excessive loss from percolation in the porous soil. Diversion dams built across the creek divert water into large ditches. The fields, many of which have checks and borders, are then flooded from the main diversion ditches or from laterals. Several domestic rights are met by pumping directly from Hat Creek. Some ranchers have leveled their fields in recent years, thus improving their irrigation efficiency.

1991 Distribution

Watermaster service on Hat Creek began on May 1 and continued through October 7, with John P. Clements, Associate Engineer, Water Resources, as watermaster.

The flow of Hat Creek at the USGS gage on May 1 was 101 cfs. Due to a snowpack of around 90 percent of normal for Lassen Peak, the flow of Hat Creek steadily increased after May 1 and reached a peak of 158 cfs on June 11. The flow decreased thereafter with an average flow of 100 cfs for the month of July, 96 cfs for August, and 93 cfs for September. The percentage of available water for the upper and lower rotations for the irrigation season were as follows:

Percentage of Entitlement

Period	Upper Rotation	Lower Rotation
May 1 - May 10	70	
May 11 - May 20		70
May 21 - May 30	90	
May 31 - June 9		90
June 10 - June 19	100	
June 20 - June 29		65
June 30 - July 9	70	
July 10 - July 19		60
July 20 - July 29	65	
July 30 - August 8		60
August 9 - August 18	65	
August 19 - August 28		60
August 29 - September 7	60	
September 8 - September 17		55
September 18 - September 27	60	
September 28 - October 7		55

INDIAN CREEK WATERMASTER SERVICE AREA

The Indian Creek service area is in north central Plumas County, near Greenville. The major sources of supply in the service area are Indian Creek and two tributaries, Wolf Creek and Lights Creek. Indian Creek, along with minor tributaries, rises in the mountains east of the service area. It flows through Genesee and Indian Valleys and past Taylorsville and Crescent Mills to where it joins the North Fork Feather River. Indian Creek is joined on the north by Lights Creek in southeast Indian Valley and by Wolf Creek in the northwest part of the valley. The major place of use is in Indian Valley, an irregular-shaped area of about 20 square miles. The average elevation is about 3,500 feet.

Basis of Service

The Indian Creek watermaster service area was created on February 19, 1951. It includes, with certain exceptions, the water rights set forth in Decree No. 4185, entered December 19, 1950, by the Superior Court of Plumas County, and the rights under Permit 7665 issued in approval of Application 12642 after entry of the decree. The statutory proceeding leading to the decree was entitled, "In the Matter of the Determination of the Rights of the Various Claimants to the Water of Indian Creek Stream System in Plumas County, California."

The service area has been amended twice. Watermaster service has been provided during each irrigation season since the service area was created, and annual reports show the work accomplished. There are 49 water right holders in the service area, with allotments totaling 96.715 cfs. Indian Creek decree establishes three priority classes for each major stream within the service area.

Water Supply

The water supply in the Indian Creek service area comes mainly from snowmelt, with springs and seepage maintaining some late summer flows. The flow of Wolf Creek is normally sufficient to supply all allotments until June 1. Indian and Lights Creeks have sufficient flow to supply all allotments until July 1. After these dates, flows decrease throughout the season and by the end of August, only a small part of the allotments are available. The 1991 mean daily discharge for Indian Creek near Crescent Mills is in Table 17.

Method of Distribution

The basic method of irrigation in Indian Valley is wild flooding. Small diversion dams are constructed in the stream channels to divert water into distribution ditches for conveyance to the fields. Small check dams, located throughout the fields in swales, help to spread the water over the ground. There is a limited amount of check and border irrigation in the valley, and a few sprinkler systems are in use.

INDIAN CREEK WATERMASTER SERVICE AREA

TABLE 17

1991 Daily Mean Discharge
(In cubic feet per second)

INDIAN CREEK NEAR CRESCENT MILLS[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	72	915	272	212	55	14	6.5
2	149	864	280	198	49	8.3	5.9
3	635	797	307	180	40	12	12
4	2340	758	288	177	34	12	10
5	2890	766	263	160	32	9.5	11
6	1090	1480	262	143	30	16	9.2
7	649	1380	272	131	28	16	10
8	457	970	295	119	27	14	10
9	357	784	279	94	27	16	7.4
10	308	706	250	89	24	13	14
11	281	606	226	80	21	9.4	15
12	282	520	212	71	19	13	14
13	399	466	208	72	18	9.6	10
14	383	446	221	69	18	14	8.9
15	308	440	196	60	17	19	9.5
16	258	413	190	59	19	24	12
17	239	376	277	58	16	24	15
18	282	359	362	54	13	22	16
19	293	334	359	50	12	16	10
20	313	331	370	48	16	14	9.4
21	289	340	397	47	24	13	17
22	252	326	406	45	23	15	14
23	264	327	384	41	27	15	12
24	351	347	370	34	21	14	14
25	351	390	340	35	21	11	16
26	347	372	314	40	17	10	12
27	329	341	279	39	17	12	12
28	398	302	248	55	19	8.7	9.7
29	542	292	229	72	16	11	12
30	712	275	248	63	15	6.0	11
31	832		231		15	5.9	
MEAN	537	567	285	86.5	23.5	13.5	11.5
AC-FT	33030	33770	17520	5150	1450	828	685

[1/] USGS Station

1991 Distribution

Watermaster service began in the Indian Creek service area on April 15, 1991, and continued through October 1, 1991, with Ralph D. Howell, Water Resources Engineering Associate, as watermaster. The 1991 water season was below average for the Indian Valley watermaster service area.

Wolf Creek

The available water supply of Wolf Creek was adequate to supply 100 percent of the first priority allotments through May; by the middle of July the flow was down to 25 percent of the first priority where it remained for the rest of the season.

Lights Creek and Tributaries

The available water supply of Lights and Cooks Creeks was adequate to supply 100 percent of the first and second priorities through May. By early July there was only enough water to supply 25 percent of the first priority rights and by early August there was no water.

Indian Creek

The available water supply of Indian Creek was adequate to supply all demands through May. By the middle of August the flow was adequate to supply 75 percent of the first priority rights and remained at this level for the duration of the season.

MIDDLE FORK FEATHER RIVER WATERMASTER SERVICE AREA

The Middle Fork Feather River service area is in Sierra Valley on the west slope of the Sierra Nevada in eastern Sierra and Plumas Counties.

Major sources of supply for this service area are the Middle Fork Feather River and its tributaries in the Sierra Valley. The area comprises five major stream groups. Starting in the northeast corner of the valley and proceeding in a clockwise direction, these are Little Last Chance Creek, Smithneck Creek, Weber Creek and tributaries, West Side Canal, and Fletcher Creek and Spring Channels. The Middle Fork Feather River flows generally north for about 15 miles through Sierra Valley. It then flows westerly out of the valley near Beckwourth. The major place of use is in Sierra Valley, which is about 15 miles long and 10 miles wide. The average elevation of the valley floor is 4,900 feet.

Basis of Service

The Middle Fork Feather River watermaster service area was created on March 29, 1940, to include, with the exception of certain tributaries and springs, all water rights set forth in Decree No. 3095, entered in the Middle Fork Feather River statutory adjudication proceeding on January 19, 1940, Superior Court, Plumas County. The decree establishes the number of priority classes for each of the major stream systems within the Middle Fork Feather River service area as follows: (1) Little Last Chance Creek - eight; (2) Smithneck Creek - five; (3) West Side Canal Group - five; (4) Fletcher Creek and Spring Channels - three; (5) Webber Creek and tributaries - six; and (6) Sierra Valley Water Company - one.

The service area has been amended three times. Watermaster service has been provided during each irrigation season since the service area was created, and annual reports have been prepared to show the work accomplished.

There are currently 118 water right owners in the service area, with total allotments amounting to 376.739 cfs.

Water Supply

The major water supply in the Middle Fork Feather River service area comes from runoff, with minor flow from springs and supplemental and foreign water.

Natural flows of Little Last Chance Creek are supplemented by reservoir storage provided by Frenchman Dam, which was built by the Department of Water Resources in 1961. Stored water is released as needed under the provisions of a water supply contract.

Smithneck Creek flow is normally sufficient to supply all allotments until about the middle of May. It then decreases until about June 1 when only first and second priority allotments are available for the remainder of the season.

The natural flow of Weber Creek is normally sufficient to supply all allotments until the middle of May. At that time, up to 60 cfs is diverted from the Little Truckee River to supplement the natural flow. This imported water is diverted through the Little Truckee Ditch into Onion Creek and then into Weber Creek, via Cold Stream, for use of shareholders in the Sierra Valley Water Company. This supplemental supply decreases rapidly in July, producing only a small quantity during the latter part of the season.

The West Side Canal streams normally supply all allotments until early June. The flow then gradually declines throughout the remainder of the season. The flow of Fletcher Creek and Spring Channels normally supplies all allotments until July 1. Then it gradually declines for the rest of the season.

Records of the daily mean discharges of Little Truckee Ditch and the Middle Fork Feather River near Portola are presented in Tables 18 and 19.

Method of Distribution

Wild flooding is used by most ranches to irrigate their fields. Small diversion dams are placed in the stream channels to divert the water into individual distribution systems. Check dams are constructed in the swales to implement flooding once the water reaches the fields.

1991 Distribution

Watermaster service began March 15 in the Middle Fork Feather River service area and continued until September 30, with Conrad L. Lahr, Water Services Supervisor, as watermaster. The available supply in the service area was below average during the season.

Little Last Chance Creek

Frenchman Dam and Reservoir began its twenty-ninth season of operation. A five-year contract concerning storage, distribution, and sale of water was negotiated during 1989 with the Last Chance Creek Water District. Delivery and distribution of water was made in accordance with the provisions of the contract and the instructions of the District's Board of Directors. Deliveries for Little Last Chance Water District started April 22, 1991. A total of 7,148 acre-feet of water was delivered. Charles D. Hand, Water Resources Engineering Associate, preformed the duties of watermaster in the District.

Smithneck Creek

The normal two-week rotation schedule for water users below Loyalton was started April 17, 1991 with sufficient water to supply first and 30 percent of second priorities. By mid-July, the flow at this point dropped to less than 10 percent of second priority being available.

Weber Creek

Flow in this system decreased to only enough to supply first and a small portion of second priority by mid-July. Importation of water from the Little Truckee River began April 18, 1991 to supplement the natural flow of Weber Creek to satisfy all allotments of the Sierra Valley Water Company shareholders (one priority). A total of 8,273 acre-foot of water was delivered through the Little Truckee Ditch during the irrigation season. This diversion was cut off on July 26, by order of the Federal watermaster.

West Side Canal Group

Sufficient water was available to supply first and second priorities at the start of the season. The flow decreased by early August to satisfy less than 30 percent of second priority.

Fletcher Creek and Spring Creek

This system started the irrigation season with enough water to supply all of first and 50 percent of second priorities. By mid-July, the flow had dropped to an amount capable of meeting only 20 percent of first priorities.

MIDDLE FORK FEATHER RIVER WATERMASTER SERVICE AREA

TABLE 18

1991 Daily Mean Discharge
(In cubic feet per second)

LITTLE TRUCKEE DITCH AT HEAD

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1			45.8	55.6	56.2		
2			47.6	56.2	58.1		
3			45.8	58.1	53.7		
4			47.0	58.1	41.2		
5			51.2	58.1	33.6		
6			53.7	58.1	29.5		
7			57.5	58.1	20.1		
8			58.8	58.1	22.8		
9			59.4	57.5	25.1		
10			58.1	57.5	22.4		
11			55.0	52.5	18.9		
12			53.7	36.2	16.8		
13			57.5	37.8	14.1		
14			58.1	38.9	11.5		
15			59.4	39.5	10.9		
16			58.8	45.2	10.5		
17			58.1	56.2	9.8		
18		9.4[1/]	58.8	55.6	9.2		
19		21.5	58.1	55.0	10.5		
20		21.5	53.7	54.3	13.0		
21		21.5	51.2	53.1	11.5		
22		21.9	55.6	50.6	9.8		
23		28.0	58.1	46.4	12.2		
24		35.9	58.1	44.1	8.6		
25		34.6	58.1	45.8	7.3		
26		33.6	58.1	50.0	2.2[1/]		
27		33.6	58.1	42.3			
28		34.1	57.5	42.3			
29		37.3	57.5	61.4			
30		41.2	56.2	55.0			
31			55.0				
MEAN		28.8	55.5	51.2	20.8		
AC-FT		742	3411	3050	1070		

[1/] No record before April 18 and no flow after July 26.

MIDDLE FORK FEATHER RIVER WATERMASTER SERVICE AREA

TABLE 19

1991 Daily Mean Discharge
(In cubic feet per second)

MIDDLE FORK FEATHER RIVER NEAR PORTOLA

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	17	350	31	36	13	8.5	10
2	19	318	50	34	12	11	10
3	33	252	47	33	12	11	10
4	92	200	58	34	12	11	10
5	341	164	39	34	13	12	10
6	991	145	25	33	12	11	10
7	556	147	21	32	12	12	10
8	306	175	23	27	13	12	10
9	204	178	25	24	7.9	11	10
10	145	147	25	21	6.8	11	10
11	107	117	28	17	6.3	11	10
12	86	90	35	17	6.3	11	10
13	86	82	50	15	6.8	11	10
14	93	72	63	14	6.8	11	10
15	113	70	67	14	7.9	6.3	10
16	117	67	65	14	7.3	5.0	10
17	111	63	64	14	6.3	5.0	10
18	101	56	67	12	5.8	4.6	10
19	123	48	68	13	6.3	4.2	11
20	133	44	64	13	7.3	10	11
21	135	42	65	12	6.8	10	11
22	133	42	67	12	6.3	8.5	11
23	117	48	68	15	5.0	3.9	10
24	105	49	65	15	5.0	3.9	4.2
25	113	44	67	15	10	6.8	4.6
26	123	42	61	14	10	7.9	11
27	121	39	74	14	10	10	12
28	133	36	56	15	10	10	12
29	155	20	42	14	10	10	12
30	206	22	38	14	8.5	10	12
31	290		37		8.5	10	
MEAN	174.4	105.6	50.2	19.7	8.7	9.0	10.1
AC-FT	10720	6290	3080	1170	537	556	599

NORTH FORK COTTONWOOD CREEK WATERMASTER SERVICE AREA

The North Fork Cottonwood Creek service area is in Shasta County near the town of Ono, west of Redding. The source of water for this service area is the North Fork of Cottonwood Creek and its two major tributaries, Moon Creek and Jerusalem Creek. The North Fork of Cottonwood Creek flows through the service area in a southeasterly direction to where it joins the other two major forks of Cottonwood Creek and then to the Sacramento River east of the town of Cottonwood. The service area consists of sparsely scattered parcels, some in hilly terrain and some in the valleys.

Basis of Service

The water rights of this creek system were determined by court reference and set forth in Decree No. 5479, Shasta County Superior Court, dated June 9, 1920. The North Fork Cottonwood Creek watermaster service area was created September 11, 1929, although service had been provided intermittently in accordance with the decree since 1924. All water rights have equal priority.

Water Supply

Snowmelt contributes to the flow in the North Fork Cottonwood Creek system during the early part of the irrigation season, and perennial springs provide the major source of supply during the summer and fall months. The flow is normally sufficient to supply all demands except in dry years, when the available supply may be as low as 20 to 40 percent of the decreed allotments. A record of the daily mean discharge of North Fork Cottonwood Creek near Igo is presented in Table 20. This gaging station is at the lower end of the creek, but gives a general indication of the water supply.

Method of Distribution

The general practice throughout the area is to irrigate by wild flooding. One water user pumps directly from the creek, using a sprinkler system to irrigate his crops. Pumping was necessary at this diversion point because the irrigated land was considerably higher than the creek channel.

1991 Distribution

Watermaster service for North Fork Cottonwood Creek began June 1 and continued through September 30 with John A. Nolan, Water Resources Engineering Associate, as watermaster.

A major storm broke the winter drought with 9.67 inches of precipitation recorded in Redding during March. The available water supply was enough to provide 100 percent of the one priority throughout the irrigation season.

The Bee Ditch diversion dam continues to leak so much that water was not available in the ditch most of the season.

NORTH FORK COTTONWOOD CREEK WATERMASTER SERVICE AREA

TABLE 20

1991 Daily Mean Discharge
(In cubic feet per second)

COTTONWOOD CREEK NORTH FORK NEAR IGO

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	73	201	122	42	19	7.1	16
2	113	190	93	40	16	7.6	16
3	683	181	89	39	15	7.8	16
4	688	183	85	38	13	8.4	15
5	332	194	84	35	12	8.8	14
6	186	197	82	35	11	8.9	14
7	108	184	80	35	11	9.4	15
8	91	172	75	34	11	9.7	16
9	59	168	72	33	11	9.0	16
10	58	172	70	31	11	8.5	16
11	53	162	67	25	10	8.1	17
12	297	152	66	24	10	7.7	18
13	141	153	76	21	10	6.9	19
14	101	161	73	22	10	7.1	19
15	84	171	67	20	11	6.8	20
16	79	165	66	19	12	6.9	20
17	332	153	64	19	14	6.7	19
18	279	146	64	19	12	9.4	20
19	164	142	64	19	10	11	20
20	430	175	61	19	9.9	8.7	37
21	359	180	57	16	9.9	6.6	50
22	208	172	55	16	8.2	6.8	51
23	717	174	53	16	7.7	7.2	33
24	381	176	51	17	8.8	8.3	22
25	282	168	49	18	8.7	8.8	21
26	406	157	48	21	7.7	10	21
27	267	145	45	19	7.1	13	21
28	212	139	43	19	7.4	14	21
29	197	136	44	34	8.0	16	20
30	193	134	45	24	7.5	15	19
31	199		43		7.4	16	
MEAN	251	167	66.2	25.6	10.6	9.2	21.4
AC-FT	15420	9923	4072	1525	649	568	1273

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

The North Fork Pit River service area lies along the west slopes of the Warner Mountains in northeastern Modoc County and extends southward from the Oregon border about 45 miles to just south of Alturas.

The North Fork Pit River flows in a southerly direction from the south rim of Goose Lake Basin to its confluence with the South Fork Pit River west of Alturas. The basins of Goose Lake and the North Fork Pit River may be considered completely separate, since the lake has not spilled into the river for nearly 100 years.

Eight small independent streams flowing in a westerly direction from the west slope of the Warner Mountains constitute the major source of water. Three of these (New Pine, Cottonwood, and Davis Creeks) are tributary to Goose Lake. Five are tributary to the North Fork Pit River. From north to south, they are: Linville, Franklin, Joseph, Thoms, and Parker Creeks.

The place of use in the northern half of the area is a relatively long, narrow, sloping strip of land between the east shore of Goose Lake and the foothills of the Warner Mountains. The places of use in the southern half of the area, which are supplied from the North Fork Pit River and its tributaries, are primarily in the narrow valleys bordering the streams. The elevation of the places of use range from about 4,350 feet just below Alturas to about 5,200 feet at the upper portions on some of the creeks.

Basis of Service

Table 21 briefly outlines the five decrees covering the area and presents data on the establishment of watermaster service and water rights.

Water Supply

The water supply comes mainly from snowmelt for all streams in the North Fork Pit River service area except Linville Creek, which, having a relatively small drainage area, is almost entirely spring-fed. After mid-June, the rest of the streams also depend on springs, but diminish rapidly until mid-July, after which the flow remains fairly constant. There are several small reservoirs in the area, but they are used essentially for regulatory storage. The mean daily discharge of various tributaries is presented in Tables 22 through 27.

Method of Distribution

Distribution is accomplished by diversion structures in the main channels diverting into ditches that convey the water to its place of use. Wild flooding from small feeder ditches is the common method of application. There is, however, increasing use of sprinkler systems, some directly from ditches, with

TABLE 21

DECREES AND RELATED DATA - NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

Stream	Modoc County Superior Court Decree No.	Date	Type[a]	Service Area Created	No. of Decree Water Right Holders	Total cfs	Remarks
New Pine	2821	6-14-32	CR	6-22-32	21	22.15	Four priorities.
Cottonwood	2344	5-03-40	CR	12-13-40	5	15.35	When water for Diversion Creek No. 3 is insufficient to reach the area of use, it is diverted at Diversion No. 4.
Davis	2782	6-30-32	CR	7-13-32	19	68.75	Four priorities, 4-1 to 9-30. Some rights vary according to flow available. Most first & second priorities are year-round. One second priority right is for 0.40 cfs export for Roberts Creek.
					2[b]		Appropriative Permit 9825 allows diversion from North Fork Davis Creek and License 10549 to divert from Davis Creek, both for the period from 10-1 to 5-1.
Franklin	3118	9-08-33	CR	9-14-33	3	11.66	Four priorities. The first priority and all second priority rights are year-round, except one which is equal to the sum of all the others (1.46 cfs) and is for the period 9-15 to 3-31 annually. Third and fourth priorities are for 4-1 to 9-30 each year.
North Fork Pit River	4074	12-14-34	S	12-18-39	10	52.08	Five priorities, 4-1 to 9-30. Pit River Dorris Reservoir water diverted through Parker Creek ditch on Parker Creek. Fourth and fifth priorities are special class.
Linville	4074	12-14-39	S	12-18-39	3	8.30	Two priorities.
Joseph	4074	12-14-39	S	12-18-39	6	11.98	Four priorities, 4-1 to 9-30. Diversions on south side of stream, with the exception of No. 26, are on net consumptive use basis.
Parker	4074	12-14-39	S	12-18-39	9	17.87	Four priorities, 4-1 to 9-30. Diversion on Dorris Reservoir shown on North Fork Pit River schedule is made at No. 122, Parker Creek Ditch.
Shields	4074	12-14-39	S	12-18-39	7	7.70	Four priorities, 4-1 to 9-30.
Thoms	4074	12-14-39	S	12-18-39	9	6.44	Three priorities, 4-1 to 9-30.
						9.40	5.0 cfs export to Cedar Creek; and 4.40 cfs export to Stony Canyon.
Gleason	4074	12-14-39	S	12-18-39	4	4.55	Five priorities.

[a] S-Statutory, CR-Court Reference.
[b] Appropriative rights, junior to the decreed rights.

supplemental ground water being added as the surface flow diminishes. Sub-irrigation by the use of large flashboard dams to raise the water level in the channel is practiced along the North Fork Pit River between Parker Creek and Alturas.

The spring runoff from the Warner Mountains was near normal this season. This was due to a late, wet spring and storms during May and June. The flow in the streams was larger than it has been in the last ten years. New Pine and Cottonwood Creeks flowed all the way into Goose Lake for the first time in several years.

1991 Distribution

Watermaster service began in the North Fork Pit River watermaster service area on April 1 and continued through September 30. John P. Clements, Associate Engineer, Water Resources, served as watermaster from April 1 thru 14. George M. Fitzmorris, Assistant Engineer, Water Resources, served as watermaster from April 15 thru September 30.

New Pine Creek

The water in the creek reached Highway 395 on April 19 and was flowing into Goose Lake by May 22. During the period the creek was flowing below the highway, Gene Lawson, who has water rights from the creek, was diverting water from downstream of the highway to his lower meadows. The creek stopped flowing to the highway on August 20.

With the creek flow down into the second priority range, the creek was closed off on August 20, and all of the water diverted into the California ditch to meet the rights of the higher priority users.

During the spring runoff, the creek flow increased to above the full priority level on May 20. Full priority water was then available until July 8. Full third priority water was available until July 25. Full second priority water was available until August 20. The flow on September 30 was 4 cfs, just above the first priority level.

Cottonwood Creek

Cottonwood Creek started flowing past Highway 395 and into Goose Lake on May 23. The creek stopped flowing to the highway at the end of July.

When the spring runoff started, full priority water was available from May 19 through June 3. The flow then decreased rapidly to the first priority level on June 24. The flow in the creek on September 30 was 0.1 cfs.

Davis Creek

Full priority water was only available for a short period. The flow decreased to the second priority level on July 3. The creek flow receded to about 5 cfs on September 19, and to 4 cfs on September 30.

Linville Creek

Being spring-fed, there was little variation in the flow during the irrigation season. The flow on May 1 was 3.2 cfs and the flow on September 30 was 2.7 cfs.

Franklin Creek

Full priority was only available for two weeks during the spring runoff. The flow then decreased to a point where only a small portion of the third priority water was present in the creek. The flow in mid-July was about 3 cfs. The flow at the end of September was 2.3 cfs.

Joseph Creek

Full fourth priority water was available until July 6. The flow then receded rapidly. Full third priority flow was available until July 7. Full second priority water was available until July 24. The flow decreased to the first priority level and the XL Indian Reservation diversion was closed on August 12.

Release of stored water from the Halls Meadow Reservoir started before the first priority level was reached, making measurement and regulation more difficult.

Thoms Creek

Full priority water was available through mid-July. The flow decreased to about 2 cfs by August 15 and 1 cfs on September 30.

Parker Creek

Full priority water was available through mid-July. The diversion to Dorris Reservoir was closed July 22. With low priority water available for diversion to the reservoir, Dorris Reservoir filled for the first time in several years.

After haying operations were complete, the water users rotated the creek flow. On August 1, the creek flow was about 5 cfs, receding to about 3 cfs on September 30.

Shields Creek

Only a portion of the second priority flow was available during the entire irrigation season. After haying, the water users rotated the creek flow. The creek flow was about 4.5 cfs on August 1 and about 3 cfs on September 30.

North Fork Pit River

Linville Creek, Joseph Creek, and Thoms Creek furnished significant outflow to the North Fork through mid-August for irrigation by the XL Reservation. The high spring runoff allowed the Capik Reservoir on Linville Creek to fill, and the excess flowed into the North Fork of the Pit River.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 22

1991 Daily Mean Discharge
(In cubic feet per second)

NEW PINE CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		4.6[1/]	7.5	29	33	10	5.5
2		4.6	7.2	35	31	10	5.5
3		4.5	7.0	40	29	9.5	5.5
4		5.0	7.2	39	27	9.5	5.5
5		6.2	8.2	35	25	9.2	5.3
6		7.6	9.5	32	24	9.2	5.3
7		6.2	12	31	23	8.9	5.3
8		5.8	17	33	22	8.5	5.2
9		5.8	14	35	21	8.5	5.0
10		5.2	12	40	20	8.5	4.8
11		4.6	12	45	19	8.2	4.8
12		4.5	12	44	18	8.2	4.8
13		4.8	13	41	18	7.8	4.6
14		5.5	15	39	17	7.5	4.6
15		5.2	16	35	17	7.5	4.6
16		4.8	18	33	16	7.2	4.6
17		4.8	21	32	16	7.2	4.5
18		4.8	19	30	15	7.0	4.5
19		5.0	19	31	15	7.0	4.5
20		5.8	23	30	14	7.0	4.5
21		6.7	31	28	14	6.7	4.5
22		8.2	42	27	14	6.5	4.5
23		9.5	49	26	13	6.2	4.3
24		10	48	25	13	6.2	4.3
25		8.9	47	27	12	6.2	4.3
26		8.2	41	26	12	6.0	4.0
27		7.8	37	28	12	6.0	4.0
28		7.5	34	29	12	5.8	4.0
29		7.5	33	35	11	5.8	4.0
30		7.8	28	35	11	5.8	4.0
31			26		11	5.8	
MEAN		6.2	22.1	33.2	17.9	7.5	4.7
AC-FT		372	1360	1974	1101	463	279

[1/] No record before April 1.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 23

1991 Daily Mean Discharge
(In cubic feet per second)

COTTONWOOD CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		4.8[1/]	6.6	14	3.6	0.4	0.4
2		5.0	5.6	16	3.2	0.4	0.3
3		4.6	5.2	16	2.8	0.4	0.3
4		4.4	5.6	15	2.4	0.4	0.3
5		5.6	6.6	14	2.2	0.5	0.4
6		7.6	7.6	11	2.0	0.6	0.3
7		6.2	8.4	8.4	2.0	0.7	0.3
8		4.6	11	8.4	2.0	0.6	0.3
9		4.0	8.4	9.2	1.9	0.5	0.3
10		3.4	7.6	11	1.9	0.5	0.4
11		2.9	5.6	14	1.8	0.5	0.4
12		2.6	5.4	14	1.7	0.5	0.3
13		2.6	7.2	11	1.6	0.5	0.3
14		2.9	9.0	9.2	1.5	0.5	0.3
15		2.8	10	8.1	1.4	0.5	0.2
16		2.5	11	7.2	1.2	0.5	0.2
17		2.5	14	6.4	1.2	0.4	0.1
18		2.6	12	6.2	1.1	0.4	0.1
19		3.2	21	5.8	1.1	0.5	0.1
20		3.8	32	5.4	1.0	0.6	0.1
21		7.2	31	5.0	1.0	0.6	0.1
22		12	19	4.6	0.9	0.4	0.1
23		13	18	4.0	0.9	0.4	0.1
24		10	18	3.6	0.8	0.4	0.2
25		7.9	17	3.4	0.8	0.4	0.2
26		7.2	16	3.2	0.8	0.4	0.2
27		7.9	16	3.4	0.7	0.4	0.2
28		7.6	16	3.0	0.6	0.4	0.2
29		7.2	15	5.0	0.5	0.4	0.2
30		6.9	15	4.4	0.5	0.4	0.1
31		14		0.4	0.4		
MEAN		5.5	12.7	8.3	1.5	0.5	0.2
AC-FT		328	783	496	90	29	14

[1/] No record before April 1.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 24

1991 Daily Mean Discharge
(In cubic feet per second)

DAVIS CREEK BELOW DIVERSIONS NO. 1, 3, AND 21

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		9.4[1/]	13	68	28	10	6.0
2		7.8	20	63	26	10	5.7
3		7.2	14	57	25	9.7	5.7
4		8.1	13	52	23	9.4	5.5
5		10	14	48	22	8.9	5.5
6		17	16	46	20	8.6	5.5
7		11	17	47	19	8.9	5.2
8		9.7	21	48	17	8.6	5.2
9		9.0	19	51	17	8.9	5.2
10		8.1	16	57	16	8.6	5.5
11		7.8	16	63	16	8.1	5.2
12		7.2	18	67	17	7.8	5.5
13		6.8	32	61	17	7.6	5.5
14		7.2	28	55	18	7.2	5.5
15		7.2	26	48	18	7.6	5.2
16		7.6	28	45	17	6.8	5.2
17		8.6	39	41	18	6.2	5.5
18		8.9	37	39	17	5.7	5.2
19		8.1	57	37	17	5.5	5.0
20		10	91	35	16	6.5	5.0
21		15	101	32	16	7.2	4.5
22		16	97	31	15	6.8	4.2
23		14	104	31	14	6.5	4.2
24		14	107	31	13	6.2	4.0
25		15	106	32	13	6.0	3.7
26		16	99	32	13	5.7	4.0
27		14	93	32	12	5.5	3.7
28		12	87	31	12	5.7	4.0
29		12	80	32	11	6.0	3.7
30		12	75	29	10	6.0	3.7
31			71		11	6.0	
MEAN		10.6	50.2	44.7	16.9	7.4	4.9
AC-FT		628	3084	2660	1039	453	292

[1/] No record before April 1.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 25

1991 Daily Mean Discharge
(In cubic feet per second)

LINVILLE CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		2.8[1/]	3.2	3.6	2.4	2.5	2.5
2		2.8	3.4	3.5	2.3	2.5	2.5
3		3.0	3.4	3.4	2.3	2.5	2.5
4		3.0	3.2	3.4	2.2	2.5	2.6
5		3.2	3.2	3.2	2.2	2.6	2.7
6		3.4	3.1	3.2	2.4	2.6	2.8
7		3.2	3.1	3.1	2.5	2.6	2.8
8		3.1	3.1	3.1	2.6	2.5	2.8
9		3.0	3.1	3.1	2.6	2.6	2.8
10		3.0	3.2	3.1	2.6	2.6	2.7
11		3.0	3.2	3.0	2.6	2.6	2.7
12		2.8	3.4	3.0	2.5	2.7	2.7
13		2.7	3.4	2.8	2.6	2.7	2.7
14		2.7	3.2	2.6	2.6	2.7	2.7
15		2.8	3.2	2.5	2.7	2.7	2.7
16		2.8	3.2	2.4	2.7	2.7	2.7
17		2.8	3.1	2.3	2.7	2.7	2.7
18		3.0	3.1	2.3	2.7	2.7	2.6
19		3.0	3.1	2.2	2.8	2.6	2.6
20		3.1	3.2	2.2	2.8	2.6	2.6
21		3.2	3.4	2.3	2.7	2.5	2.6
22		3.4	3.5	2.4	2.7	2.4	2.7
23		3.4	3.7	2.4	2.7	2.4	2.7
24		3.4	4.5	2.4	2.7	2.4	2.6
25		3.2	5.6	2.5	2.6	2.5	2.6
26		3.4	5.3	2.5	2.6	2.5	2.7
27		3.4	4.6	2.4	2.6	2.5	2.6
28		3.2	4.5	2.5	2.6	2.5	2.6
29		3.2	4.3	2.5	2.6	2.5	2.7
30		3.1	4.0	2.4	2.6	2.5	2.7
31			4.1		2.5	2.5	
MEAN		3.1	3.6	2.7	2.6	2.6	2.7
AC-FT		183	221	163	158	157	158

[1/] No record before April 1.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 26

1991 Daily Mean Discharge
(In cubic feet per second)

FRANKLIN CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		3.3[1/]	5.0	12	5.2	2.5	2.5
2		3.3	5.2	11	4.6	2.5	2.3
3		3.4	5.2	13	4.3	2.5	2.1
4		3.7	5.5	13	4.1	2.7	2.3
5		3.9	5.8	12	3.7	2.5	2.3
6		4.6	5.8	11	3.4	2.5	2.5
7		4.1	6.6	11	3.3	2.7	2.3
8		4.3	7.1	11	3.4	2.5	2.5
9		3.9	6.6	11	3.3	2.7	2.5
10		3.4	6.8	11	3.1	2.5	2.3
11		3.7	7.1	11	3.1	2.5	2.5
12		3.4	7.3	10	2.9	2.5	2.5
13		3.7	7.6	10	3.1	2.3	2.5
14		3.4	7.9	9.2	2.9	2.3	2.5
15		3.7	7.9	8.6	2.9	2.3	2.5
16		3.7	7.6	8.0	3.1	2.5	2.7
17		3.4	7.3	7.6	3.1	2.3	2.5
18		3.7	7.1	7.1	2.9	2.3	2.5
19		4.1	7.6	7.9	2.7	2.3	2.5
20		4.3	9.0	7.9	2.9	2.5	2.5
21		4.8	12	7.3	2.5	2.1	2.1
22		5.2	14	7.1	2.7	2.3	2.5
23		5.5	13	7.1	2.5	2.3	2.3
24		5.2	13	6.8	2.5	2.1	2.3
25		5.0	12	6.8	2.7	2.1	2.3
26		5.0	11	6.6	2.5	2.1	2.5
27		5.2	12	6.8	2.9	2.3	2.5
28		5.2	13	6.6	2.7	2.5	2.3
29		5.0	13	6.2	2.5	2.5	2.3
30		5.0	12	5.8	2.5	2.5	2.3
31			11		2.5	2.5	
MEAN		4.2	8.8	9.0	3.1	2.4	2.4
AC-FT		250	540	536	192	149	144

[1/] No record before April 1.

NORTH FORK PIT RIVER WATERMASTER SERVICE AREA

TABLE 27

1991 Daily Mean Discharge
(In cubic feet per second)

JOSEPH CREEK BELOW COUCH CREEK

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		9.1[1/]	18	23	13	3.8	2.9
2		7.1	17	26	11	2.8	3.0
3		7.9	17	27	10	2.8	3.2
4		7.1	16	28	11	3.0	2.9
5		13	15	26	9.1	3.2	3.0
6		18	16	24	7.1	4.3	3.2
7		14	14	23	6.7	3.4	3.0
8		12	23	22	6.2	3.0	2.9
9		11	19	23	6.2	3.4	3.0
10		9.7	14	24	5.7	2.8	3.0
11		8.7	11	26	5.3	3.0	3.2
12		7.1	12	25	4.9	2.8	3.0
13		8.1	25	23	4.5	2.9	3.2
14		9.1	24	21	4.2	3.2	3.4
15		9.7	23	20	4.0	2.8	3.4
16		9.7	25	19	5.1	3.0	3.2
17		10	29	19	5.7	3.4	3.0
18		14	29	18	5.3	3.0	3.0
19		14	27	18	4.5	2.9	3.0
20		17	29	17	5.1	3.0	2.9
21		13	35	16	4.7	2.9	2.9
22		19	33	14	5.3	2.8	2.8
23		24	35	13	6.7	2.8	2.9
24		18	34	13	5.1	2.9	2.8
25		19	32	15	4.7	3.0	2.8
26		17	31	14	4.2	3.0	2.9
27		20	29	15	3.6	3.2	3.0
28		19	28	13	3.4	3.2	2.9
29		19	32	16	3.0	3.0	2.8
30		18	33	14	3.4	2.8	2.8
31			27		3.0	2.8	
MEAN		13.4	24.3	19.8	5.9	3.1	3.0
AC-FT		798	1492	1180	360	188	178

[1/] No record before April 1.

SCOTT RIVER WATERMASTER SERVICE AREA

The Scott River service area is in western Siskiyou County and consists of five tributaries of the Scott River: French Creek, Shackleford Creek, Sniktaw Creek, Oro Fino Creek, and Wildcat Creek. Before 1980, French Creek and Shackleford Creek were separate service areas. Wildcat Creek came into service in 1981, and the four tributaries to the Scott River were combined to form the Scott River watermaster service area.

Scott River Service Area 1991 Distribution

Watermaster service began in the Scott River watermaster service area on April 1 and ended on September 30 with Keithal B. Dick, Water Resources Technician II, as watermaster. Lester L. Lighthall, Water Resources Technician II, was called into service on April 15 and finished on September 30. Mr. Lighthall's services were needed to assist Mr. Dick because of the increased need for regulation.

French Creek

The French Creek service area is in Scott Valley, western Siskiyou County, near the town of Etna. The major sources of water supply are French, Miners, and North Fork French Creeks. French Creek flows northeast through the center of the service area. Miners Creek begins east of the headwaters of French Creek and flows in a northerly direction, joining French Creek about three miles above its confluence with Scott River. North Fork French Creek begins north of the headwaters of French Creek and flows easterly, joining French Creek one mile upstream from the confluence with Miners Creek.

The service area encompasses the entire agricultural area within the French Creek Basin and some additional lands along the west side of the Scott River near the town of Etna. It is about 0.5 mile wide and 5 miles long, with the main axis and drainage running from south to north. Elevations of the agricultural area range from about 3,200 feet at the south to about 2,800 feet at the confluence of French Creek and Scott River.

Basis of Service. The rights of this creek system were determined by court reference and set forth in Decree No. 14478, Siskiyou County Superior Court, dated July 1, 1958.

The French Creek watermaster service area was created on November 19, 1968, and service was started on July 1, 1969.

Water is distributed according to three schedules: North Fork French Creek, with three priorities; Miners Creek with three; and the French Creek, Horse Range Creek, Paynes Lake Creek, and Duck Lake system, with seven.

These schedules are independent of each other with two exceptions: (1) Miners Creek users have the option of diverting from French Creek when water is not available from Miners Creek, and (2) maximum allowable flows are specified at given points, regardless of the source of the water.

One peculiarity of this decree is that it included two water rights that have a specified amount, which are subject to the exclusive control of the other owners of the ditch.

Water Supply. The water supply comes from snowmelt runoff, springs and seepage, and occasional summer thundershowers.

The watershed of French Creek contains about 32 square miles of heavily forested, steep mountainous terrain of the easterly slopes of the Salmon Mountains. It varies in elevation from about 7,200 feet along its west rim to about 3,200 feet at the foot of the slopes bordering French Creek Valley. Snowmelt runoff is normally sufficient to supply all demands until about the middle of July. The daily mean discharge of French Creek above North Fork French Creek is presented in Table 28.

French Creek 1991 Distribution

The season started on French Creek with all users receiving full rights. These flows continued above 100 percent of all priorities until July 1. By August 5, distribution was down to second priority users only and continued at that rate until September 30, the end of the irrigation season.

Releases were started from Smith Lake to the North Fork Ditch users on July 4.

Shackleford Creek

The Shackleford Creek service area is in western Siskiyou County near the town of Fort Jones in Scott Valley. The major sources of water for this service area are Shackleford Creek, which flows through the central part of Quartz Valley, and its tributary, Mill Creek, which rises east of the headwaters of Shackleford Creek. Evans Creek, a small tributary to Mill Creek, enters from the south.

The service area encompasses the Quartz Valley region of Scott Valley and includes the entire agricultural area within the Shackleford Creek Basin. It is about 2 miles wide by 6 miles long, with the main axis and drainage running from south to north. Elevations on the agricultural area range from about 3,100 feet at the south to about 2,650 feet at the confluence of Shackleford Creek and Scott River.

Basis of Service. The Shackleford Creek watermaster service area was created on November 6, 1950. Water is distributed under the provisions of a statutory adjudication which resulted in Decree No. 13775, Siskiyou County Superior Court, dated April 3, 1950.

The allotments are defined in four separate schedules. The upper and lower Shackleford Creek groups each have seven priority classes. The upper Mill Creek group and lower Mill Creek group each have three priority classes.

The decree also includes two storage rights upstream of all diversions. This stored water is released late in the irrigation season to Shackleford Creek for use by water right holders.

TABLE 28

1991 Daily Mean Discharge
(In cubic feet per second)

FRENCH CREEK ABOVE NORTH FORK FRENCH CREEK

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1			28	32	14	3.6	4.5
2			27[1/]	43	13	3.6	4.2
3				46	14	3.6	4.0
4				40	13	3.6	3.8
5				34	12	3.6	3.8
6				30	10	3.8	3.8
7				29	9.4	4.0	3.8
8				29	9.1	3.6	4.0
9				32	8.5	3.4	4.0
10		16[1/]		38	8.2	3.4	4.2
11		15		37	7.9	3.4	3.8
12		14		34	7.6	3.6	3.6
13		15		29	7.4	4.7	3.2
14		16		23	8.2	4.5	3.6
15		16		21	6.9	4.0	3.4
16		16		19	7.6	3.8	3.4
17		16		18	8.8	3.8	3.2
18		16		17	7.6	3.8	3.2
19		16		18	7.4	3.8	3.2
20		16		19	7.1	3.6	3.0
21		16		17	6.9	3.6	3.0
22		16		16	6.3	3.6	3.2
23		22		18	6.6	3.6	3.2
24		22		19	6.3	3.4	3.2[1/]
25		21		18	5.8	3.4	
26		19		16	5.3	3.4	
27		19		15	4.9	3.4	
28		18		15	4.7	5.3	
29		19	43[1/]	16	4.0	5.6	
30		18	39	14	3.8	4.7	
31			32		3.6	4.5	
MEAN		17		25	8.2	3.9	3.6
AC-FT		718		1492	507	237	

[1/] No record before April 10 and from May 3 through May 28, and after September 24.

Water Supply. The water supply for Shackleford Creek comes from snowmelt runoff, springs and seepage, and supplemental stored water released from Campbell Lakes, near the headwaters of Shackleford Creek.

The watershed of the Shackleford Creek stream system contains about 31 square miles, located in the heavily forested, steep mountainous terrain of the northeasterly slopes of the Salmon Mountains. It varies in elevation from about 7,000 feet along its west rim to about 3,000 feet at the foot of the slopes bordering Quartz Valley. Snowmelt runoff is normally sufficient to supply all demands until the middle of July. The supply then usually decreases until the first part of August when water is released from Cliff and Campbell Lakes to maintain sufficient flow in the Shackleford Ditch.

Method of Distribution. Irrigation is accomplished primarily by wild flooding of permanent pasture and alfalfa fields. Water is distributed by ditches and laterals to the places of use. Shackleford Ditch, the largest of these ditches, has a length of about 6 miles and a capacity of about 12 cfs.

Shackleford Creek 1991 Distribution

The season started on Shackleford Creek with all users receiving full rights.

Releases were started from Campbell Lake to the Shackleford Ditch on July 25. One hundred percent of all second priority allotments were available through September 30.

Sniktaw Creek

The Sniktaw Creek service area is in western Siskiyou County, seven miles west of the town of Fort Jones in Scott Valley. It encompasses an agricultural area about three miles long and one mile wide, running from south to north. Elevations in the Sniktaw watershed range from 6,700 feet in the southwest to about 2,650 feet at the confluence of Sniktaw Creek and Scott River.

Basis of Service. The Sniktaw Creek service area was added to the Scott River watermaster service area on April 1, 1981. Water is distributed under the provisions of a statutory adjudication which resulted in Decree No. 30662, Siskiyou County Superior Court, dated January 16, 1980.

The allotments are defined in the Scott River Decree, Schedule B 38, which has three priority allotments.

Water Supply. The water supply for Sniktaw Creek comes from snowmelt, springs, and seepage. Water from Shackleford Creek (Diversions 3, 17, 19, 20, and 21) supplements available water in Sniktaw Creek.

Return water from Heide's Shackleford Creek Ditch, Diversion 3, commingles with natural flow of Sniktaw Creek. After leaving the Heide property and entering Sniktaw Creek, it is allotted as set forth in Schedule B 38 (Sniktaw Creek) from Diversions 665 to 679.

Heide may use tailwater from Shackleford Creek Ditch, Diversion 3, for irrigation of 27 acres under License 10875 issued on Application 22882 for use on former Indian lands. The right may be exercised only at times that Heide is receiving water from Shackleford Creek Ditch, Diversion 3, or at times that all Sniktaw Creek allotments are being filled.

Sniktaw Creek 1991 Distribution

All priorities were filled until June 5; by July 1, the water supply had receded to 50 percent of second priority. The Heide Ditch from Shackleford Creek was closed June 27.

Wildcat Creek

The Wildcat Creek service area is in western Siskiyou County near the town of Callahan. The major sources of water are Wildcat Creek, which flows through the service area, and foreign water imported from Jackson Creek, Grizzly Creek and Camp Gulch.

Basis of Service. The Wildcat Creek watermaster area was started May 1, 1980. Water is distributed under a statutory adjudication that resulted in Decree No. 30662, Siskiyou County Superior Court, dated January 16, 1980. The allotments are defined in the Scott River Decree, Schedule B 10.

Method of Distribution. Irrigation is done mainly by wild flooding of permanent pasture. Water is distributed by ditches and laterals to the place of use.

Wildcat Creek 1991 Distribution

The water supply was normal. Import water from Sugar Creek and Jackson Creek helped supply water to the Kerrigan Ranch, and runoff from the Kerrigan Ranch helped supply the Struckman Ranch. Recorders were installed on the Parshall flumes at points A and B, described in the decree. By August 5, the natural flow of Wildcat Creek was down to 1.0 cfs. Recorders were installed on the Jackson Creek Ditch and at Kerrigan's diversion from Wildcat Creek to determine the natural flow of Wildcat Creek.

Oro Fino Creek

The Oro Fino Creek watermaster service area is in southwestern Siskiyou County near the town of Greenview. It encompasses an agricultural area about 5 miles long and 0.5 mile wide, running from south to north. Elevations along Oro Fino Creek range from 2,900 feet near the headwaters to 2,700 feet at the confluence of Oro Fino Creek and the Scott River.

Basis of Service. The Oro Fino Creek service area was added to the Scott River watermaster service area on July 1, 1984. Water is distributed under the provision of the statutory adjudication which resulted in Decree 30662, Siskiyou County Superior Court, dated January 6, 1980.

Water Supply. The water supply for Oro Fino Creek above Diversion 606 is derived from Kidder Creek. Springs feed Oro Fino Creek below Diversion 607. Allotments are diverted from underflow by means of offset wells or sumps at Diversions 606, 606a, 611, and 612. The allotments at Diversions 607, 608, 609, 610, 613, 613a, 614, 615, and 616, may be diverted, at the option of the claimant, from surface flow or from underflow by means of offset wells or sumps or a combination of both with the provision that when surface flow in the creek (at the county road at the O. Lewis property) recedes to 3 cfs, the percentage or amount of the surface flow reaching the point of diversion of each of the following claimants shall be bypassed at the claimant's lower property line: Friden, 51 percent; O. Lewis, 96 percent; and Luckensmeyer, all flow in excess of 1.31 cfs.

The ground water table along Oro Fino Creek is recharged mainly by Kidder Creek Diversions 446 and 448 which supply surface water to the Foster and Friden lands. Kidder Creek streamflow for these diversions is mainly snowmelt runoff.

Oro Fino Creek 1991 Distribution

The water supply of Oro Fino Creek was normal. No regulation was required this season.

SHASTA RIVER WATERMASTER SERVICE AREA

The Shasta River service area is in the central part of Siskiyou County. Willow Creek and Cold Creek, formerly in the Klamath River watermaster service area, were incorporated into the Shasta River watermaster service area in 1983.

The water supply comes from Shasta River and its several tributaries. The upper reaches of the service area are served by two groups of tributaries. One group, comprising Boles, Beaughan, Carrick, and Jackson Creeks, rises on the northwestern slopes of Mount Shasta. The other group, consisting of Dale and Eddy Creeks, and Shasta River west of Interstate 5, rises on the eastern slopes of the Trinity Mountains. All these streams join the mainstem Shasta River above Lake Shastina (Dwinnell Reservoir) near the town of Weed. As the Shasta River flows northward from Lake Shastina to its confluence with the Klamath River, north of Yreka, it is joined by three major tributaries. Parks Creek, rising on the eastern slopes of the Trinity Mountains, enters from the west near the town of Gazelle. Big Springs Creek, from Big Springs Lake, enters from the east about a mile below Parks Creek. Little Shasta River, rising on the slopes of the mountainous area between Butte Valley and Shasta Valley, enters from the east near the town of Montague.

Shasta Valley is about 30 miles long and 30 miles wide. In the center of the valley are many small, cone-shaped, volcanic hillocks that divide the area into separate parts. Because of these volcanic formations, only about 141,000 acres of about 507,000 acres in the valley are irrigable. The valley floor elevation averages about 3,000 feet.

Willow Creek is in Siskiyou County, about 10 miles northeast of Montague. It is the major source of water to the service area and rises on the west slope of the 7,800-foot Willow Creek Mountain. It flows northwest through about 11 miles of rolling hills to its confluence with the Klamath River. The Willow Creek area is about 8 miles long by 1 mile wide and varies in elevation between about 2,600 and 4,000 feet.

Cold Creek is just south of Copco Lake, a hydroelectric power reservoir on the Klamath River in the extreme northern part of Siskiyou County. Yreka is 30 miles southwest of the Cold Creek stream system. Elevations within the Cold Creek watershed range from 2,900 feet to about 6,500 feet.

Basis of Service

The Shasta River watermaster service area was created on March 1, 1933. The appropriative water rights on this stream system were determined by a statutory adjudication that resulted in Decree No. 7035, Siskiyou County Superior Court, dated December 29, 1932.

The decree lists the water rights of the entire stream system by the names of the users. The rights supervised by the watermaster are broken down into eight separate schedules. These are: Shasta River above its confluence with

Big Springs Creek - 43 priorities; Boles Creek - 20 priorities; Beaughan Creek - 5 priorities; Jackson Creek - 7 priorities; Carrick Creek - 13 priorities; Parks Creek - 25 priorities; Shasta River below its confluence with Big Springs Creek and Big Springs Creek and tributaries - 29 priorities; and Little Shasta River - 7 priorities. Additional schedules include Willow Creek, Yreka Creek, and miscellaneous independent springs, gulches, and sloughs, but these are not included in the service area.

Montague Water Conservation District has appropriative rights for storage of Shasta River and Parks Creek water in Lake Shastina. By agreement with the District, five nearby downstream users receive water from storage in lieu of their decreed continuous flow allotments. The watermaster handles the reservoir releases for these users. A peculiarity of the Shasta River decree is that it defines only appropriative rights and excludes a number of riparian users on the Lower Shasta River. Holders of these riparian rights are subject to beneficial use and are regulated during periods of short water supply by the watermaster.

Water Supply

The water supply for Shasta Valley comes from snowmelt runoff, springs and underground flow, and occasional summer thundershowers. In several parts of the stream system, the springs from underground flow are enough to supply most allotments throughout the season. Much of the underground flow comes from the northern slopes of Mount Shasta, which rises to 14,162 feet at the south end of Shasta Valley. Although the snowpack on Mount Shasta is usually heavy, there is little surface runoff.

Parks Creek, Upper Shasta River, and Little Shasta River get much of their water from snowmelt runoff, usually enough to supply allotments until the middle of May.

Beaughan Creek, Carrick Creek, Shasta River from Boles Creek to Lake Shastina, Big Springs, and Lower Shasta River have enough runoff from springs to supply many of the allotments throughout the season.

Records of the daily mean discharge at several stream gaging stations in the Shasta River service area are in Tables 29 through 32, pages 77 through 80. The daily mean storage in Lake Shastina is in Table 33, page 81.

Method of Distribution

Irrigation of permanent pasture and alfalfa lands is mainly by wild flooding. Much of the return water is recaptured and used on lower pasture lands. Sprinkling systems are used for irrigating some alfalfa and grain lands. Water is routed by diversion dams and then carried by ditch or canal to the place of use. The largest and longest canal in the area is the Edson-Foulke Yreka Ditch, which has a capacity of about 60 cfs and a length of about 14 miles. Water is also supplied to ditch systems by pumped diversions, the three largest belonging to two irrigation districts and a private water users' association. Some riparian lands are also served by pump diversions.

Many privately-owned storage reservoirs are in the area. Water from these reservoirs supplements continuous-flow allotments.

Because of their large rights, the watermaster's close surveillance of Grenada and Big Springs Irrigation Districts and Shasta River Water Users Association is very important, particularly in dry years. Control of releases from Montague Water Conservation District's Dwinnell Reservoir (Lake Shastina) is another responsibility of the watermaster. This includes measurement of deliveries of stored water to users just below the dam. Control of releases from Hammond Lake is also a duty of the watermaster as of 1989.

1991 Distribution

Watermaster service began April 1 in the Shasta River wastermaster service area and ended September 30 with Keithal B. Dick, Water Resources Technician II, as watermaster. Lester L. Lighthall, Water Resources Technician II, was called into service on April 15, and finished on September 30. Mr. Lighthall's services were needed to assist Mr. Dick because of the record low water supply, which was less than 90 per-cent of normal, and the unusually dry conditions during the first part of the year.

Parks Creek

Flows were well below normal until the first part of May, when there was enough to fill the irrigation demand and provide excess to Dwinnell Reservoir until June 1. Flows decreased and third priorities were out by July 10. Flows continued to decrease, with 2.7 cfs by the end of August.

Upper Shasta River

Regulation was required from April 1. Shasta River was extremely low until the first part of May, when rains occurred, and the flow in upper Shasta River was enough to fill all priorities until July 6. Flow decreased to 26 percent of third and fourth priorities in August and remained near that level until the last part of September. Lower priorities below the Yreka Ditch received return flow and inflow from springs after July 6.

The Hammond Reservoir Irrigation Association, owners of the Hammond Reservoir, was added to the Shasta River watermaster service area in 1988. The 348-acre-foot reservoir has storage licenses 5261 and 6531 for water diverted from the North Fork Sacramento River. The stored water is released to the Shasta River and then diverted into diversions 3, 4, 4 west, 5, 6, 7, and 19. The releases are measured at a recently installed weir located downstream from the reservoir. The Hammond Ranch has been subdivided over the past 20 years and, as a result, the present place-of-use maps are no longer accurate. The Association is in the process of updating these maps. The reservoir filled and remained full until July 5; releases started July 4. The reservoir was drained by September 18. Diversions from North Fork Sacramento River were started on May 1, and ended July 1.

Boles Creek and Shasta River to Lake Shastina (Dwinnell Reservoir)

Boles Creek and this portion of Shasta River are operated as one stream under a long-standing oral agreement among the water right holders. The water is distributed on a correlative, equal-priority basis. Water was set to 100 percent of all rights on July 3. Flows decreased to 70 percent of rights by mid-August and remained between 70 and 75 percent for the rest of the season.

Beaughan Creek

With close regulation of the upper users, all priorities were satisfied for the entire season.

Carrick Creek

Carrick Springs supplied enough water to satisfy all 13 priorities for the entire season with close regulation.

Little Shasta River

There was less than average snowmelt runoff again this season on the Little Shasta River. The flows started at 100 percent of fourth priority and remained until May 1, increased to 100 percent of sixth priority, then declined to 60 percent of sixth priority on May 14. On July 1, the available flow provided 25 percent of fifth priority, declined to 100 percent of fourth priority by late August 1, and remained at that level until September 30.

Dwinnell Reservoir

Storage in Dwinnell Reservoir on April 1 was 14,900 acre-feet and increased to 15,020 acre-feet by April 10. On September 30, storage was down to 2,300 acre-feet. By agreement with the Montague Water Conservation District, owner of Dwinnell Reservoir, water users on Shasta River below the reservoir received stored water on demand.

Deliveries to Natural Flow Water Right Owners Below Dwinnell Reservoir - 1991

Name of Water Right Holder	Allotment (in acre-feet)	Amount Delivered from Dwinnell Reservoir (in acre-feet)
J. N. Taylor	1,200	1,200
Flying L Ranch	198	0
Hole-in-the-Ground Ranch	596	596
Seldom Seen Ranch	924	924
Hidden Valley Ranch	464	260
	3,382	2,980

Big Springs Lake

Big Springs Irrigation District used their own wells, and no water was received from Big Springs Lake. An agreement between E. J. Louie, A. H. Newton, Jr., and

Montague Water Conservation District was made during the winter of 1986. They agreed that when the flows of Big Springs recede from 17.5 cfs to 10.0 cfs, Montague Water Conservation District would do the following:

- Turn off the Basey pumps until the flow of Big Springs was 17.5 cfs or pay A. H. Newton, Jr. the additional power cost to use his own pumps.

- If flows of Big Springs fall below 10.0 cfs, Montague Water Conservation District will shut off the Basey pumps until flows return to above 10.0 cfs.

From April 1 until the first of September, daily observations were made. On April 13, Montague Water Conservation District was required to shut off one Basey pump; eventually, all three Basey pumps had to be turned off for a short period during the irrigation season.

Lower Shasta River

The flows in the Lower Shasta River were enough to supply all priorities until April 14. On this date, Grenada Irrigation District had to shut off one pump. Water supply fluctuated at times, and Grenada Irrigation District pumps had to operate intermittently.

Willow Creek (North of Montague)

Basis of Service. Willow Creek has had a long history of litigation. The present basis of service was initiated in 1949 when the Department of Public Works, Division of Water Resources was asked to referee a civil suit. The matter was not finalized by a decree until 1972. The issues involved were reopened in 1971, and by Decree No. 24482, dated April 28, 1972, the Siskiyou County Superior Court appointed the Department of Water Resources to supervise distribution of water in accordance with an earlier agreement between the users which defined their respective rights. Accordingly, Klamath River Watermaster Service Area (formerly Willow Creek Watermaster Service Area) was created on June 22, 1972, and service began on July 1, 1972.

There are three water users in the service area. Distribution is on a fractional basis until the flow drops to a specified amount below the upper two users. At that time, the total flow is rotated between the upper two users.

Water Supply. The main source of water for the Willow Creek stream system is from snowmelt. Runoff from the snowmelt begins late in March or early April and is almost entirely gone by June. Thereafter, the streamflow decreases rapidly until about July 25. From then until the rainy season begins, the flow remains at a low-flow stage sufficient to provide domestic and stock-watering purposes to the two upper users.

Method of Distribution. Both sprinkler and flood irrigation are used in the Klamath River service area. The upper water user has the option of using gravity diversions for either flood or sprinkler irrigation. The middle user relies entirely on runoff from the upper user's flood irrigation. The lower user in the area uses both flood and sprinkler irrigation during the early season when the supply is abundant. As the supply dwindles, the remaining water is pumped from a sump to the sprinkler system.

1991 Distribution. Water was so low by June 1, all remaining flows were rotated by upper users.

Cold Creek

Basis of Service. A statutory adjudication of Cold Creek in 1978 ordered the Department of Water Resources to provide watermaster service at Diversions 2, 3, and 4, and at the division weir on the Silva-Lennox Ditch. Watermaster service began April 1, 1981.

Water Supply. The water supply of the Cold Creek stream system satisfied requirements until July.

Method of Distribution. Both sprinkler and flood irrigation are used in Cold Creek service area.

1991 Distribution. Flow is from springs and remained very constant all season. A recorder was operated at the automatic split.

SHASTA RIVER WATERMASTER SERVICE AREA

TABLE 29

1991 Daily Mean Discharge
(In cubic feet per second)

SHASTA RIVER NEAR YREKA[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	164	124	60	59	70	17	16
2	167	92	75	56	59	18	18
3	188	70	75	60	37	17	12
4	218	68	69	40	31	22	20
5	249	64	67	34	27	22	25
6	223	62	61	24	16	24	59
7	177	63	65	28	23	22	99
8	163	59	47	37	24	15	39
9	159	51	50	22	21	12	44
10	153	48	39	30	23	14	37
11	151	49	36	33	20	15	25
12	155	40	40	39	27	24	18
13	151	24	60	29	27	25	30
14	144	17	79	29	27	23	37
15	145	22	73	33	43	25	26
16	143	24	67	25	54	34	21
17	141	31	321	16	60	30	40
18	140	28	349	15	40	25	26
19	139	38	354	57	32	15	21
20	135	40	314	58	31	12	19
21	135	52	314	47	26	27	21
22	138	60	287	33	18	27	35
23	138	81	187	33	17	35	41
24	134	77	149	46	29	35	35
25	137	70	135	59	87	26	32
26	137	69	106	88	51	18	34
27	131	55	80	83	45	20	30
28	125	53	62	78	38	21	30
29	126	54	59	72	29	23	20
30	126	45	71	79	26	20	25
31	124		74		19	18	
MEAN	153	54.3	123	44.8	34.7	22.0	31.2
AC-FT	9430	3230	7590	2660	2140	1350	1850

1/ USGS Station

SHASTA RIVER WATERMASTER SERVICE AREA

TABLE 30

1991 Daily Mean Discharge
(In cubic feet per second)

SHASTA RIVER NEAR EDGEWOOD

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	9.5	28	12	24	8.0	2.6	1.4
2	40	23	10	29	8.6	2.6	1.8
3	510 E	18	7.7	41	7.4	2.6	1.7
4	741 E	15	9.4	36	6.3	3.1	1.9
5	244	19	13	24	5.7	4.1	1.9
6	109	47	17	19	5.2	3.2	1.9
7	75	32	19	19	5.3	3.1	2.0
8	53	14	23	20	4.9	2.9	1.8
9	28	9.0	23	21	4.0	2.8	2.2
10	32	7.9	15	25	3.6	2.8	2.5
11	27	7.3	13	28	3.8	2.5	2.3
12	32	7.0	11	26	3.3	2.5	2.1
13	34	6.5	24	23	3.0	2.4	2.4
14	25	5.6	27	19	2.8	1.9	2.3
15	24	5.9	18	13	2.9	2.6	2.6
16	22	6.3	34	11	4.2	2.2	2.5
17	27	6.4	81	11	5.6	2.1	2.3
18	26	5.8	101	10	5.0	2.0	1.9
19	16	5.8	70	15	3.7	2.1	2.1
20	27	6.5	71	15	3.2	2.1	1.9
21	21	7.9	76	11	3.0	1.9	2.4
22	19	7.4	87	8.8	2.8	2.1	2.7
23	47	9.5	96	14	3.4	1.9	2.7
24	38	14	96	17	35	2.0	3.1
25	36	12	92	22	14	1.6	2.8
26	29	9.1	71	19	5.4	1.6	2.4
27	27	8.0	54	12	3.5	1.4	2.6
28	22	6.3	46	10	2.9	1.7	2.5
29	18	5.7	42	13	2.8	1.4	2.7
30	17	5.7	44	11	2.7	1.4	3.3
31	22		29		3.0	1.3	
MEAN	77.3E	12.1	43.0	18.9	5.6	2.3	2.3
AC-FT	4755 E	717	2643	1124	347	140	136

E - Estimated

SHASTA RIVER WATERMASTER SERVICE AREA

TABLE 31

1991 Daily Mean Discharge
(In cubic feet per second)

PARKS CREEK ABOVE EDSON-FOULKE YREKA DITCH

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1			20	23	9.3	6.0	3.0
2			20	26	8.7	6.0	2.9
3			20	26	8.4	6.0	2.9
4			22	24	7.8	5.7	2.9
5			24	22	7.2	6.0	2.9
6			24	21	6.6	5.7	2.9
7			25	20	5.7	3.9	2.9
8			25	21	5.3	3.1	2.9
9			22	19	4.9	3.0	2.9
10			20	18	4.7	3.1	2.9
11			20	18	4.5	3.1	2.8
12			21	17	4.5	3.0	2.8
13			23	17	4.1	2.9	2.8
14			23	16	4.1	2.9	2.8
15			23	16	4.1	3.1	2.8
16			26	16	4.3	3.0	2.8
17		16[1/]	27	15	4.5	2.9	2.8
18		16	26	14	4.3	2.9	2.8
19		16	26	16	4.1	2.9	2.8
20		16	29	13	3.9	3.0	2.8
21		16	32	12	3.9	3.0	2.8
22		17	34	12	3.9	3.0	2.8
23		20	34	12	3.9	3.0	2.8
24		20	34	13	7.5	3.0	2.7
25		20	32	15	10	3.1	2.7
26		17	30	14	8.4	3.1	2.7
27		16	28	11	7.5	3.1	2.7
28		16	27	11	6.9	3.1	2.7
29		17	26	12	6.6	3.1	2.7
30		18	24	10	6.3	3.1	2.7
31			23		6.3	3.1	
MEAN		17.2	25.4	16.7	5.9	3.6	2.8
AC-FT		478	1567	992	361	222	167

[1/] No record before April 17.

SHASTA RIVER WATERMASTER SERVICE AREA

TABLE 32

1991 Daily Mean Discharge
(In cubic feet per second)

SHASTA RIVER AT MONTAGUE-GRENADA HIGHWAY BRIDGE

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		161[1/]	61	45	97	20	22
2		107	77	51	80	19	11
3		80	77	36	36	24	17
4		90	71	31	33	24	26
5		74	61	23	20	27	41
6		87	71	20	27	29	31
7		84	58	33	23	31	41
8		67	64	19	17	11	29
9		61	31	27	16	16	31
10		58	27	36	24	14	20
11		55	27	29	27	22	22
12		34	27	36	29	34	24
13		13	31	41	38	31	34
14		19	43	40	51	31	29
15		23	64	33	40	26	12
16		41	70	45	41	31	31
17		30	290	48	31	27	27
18		33	290	27	33	13	20
19		33	282	13	19	13	19
20		34	275	41	11	19	12
21		51	256	31	13	29	24
22		48	186	26	13	31	29
23		84	172	31	33	38	34
24		74	130	45	74	38	34
25		67	94	61	71	23	36
26		64	71	103	58	24	27
27		40	51	90	23	26	23
28		45	51	90	23	26	20
29		51	48	94	23	26	16
30		43	67	97	20	22	24
31			59		17	19	
MEAN		58	103	45	34	25	26
AC-FT		3473	6311	2662	2104	1515	1519

[1/] No record before April 1.

SHASTA RIVER WATERMASTER SERVICE AREA
Water Year 1990-91

TABLE 33

LAKE SHASTINA (DWINNELL RESERVOIR)
DAILY MEAN STORAGE IN ACRE-FEET

DAY	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	2,950	3,820	5,320	7,030	8,560	10,300	14,900	13,090	14,080	11,700	5,600	1,780
2	2,950	3,820	5,390	7,030	8,650	10,300	14,900	12,980	13,970	11,700	5,530	1,720
3	3,000	3,820	5,390	7,120	8,920	10,500	14,900	12,980	13,860	10,500	5,250	1,660
4	3,000	3,880	5,460	7,120	9,100	11,800	15,020	12,980	13,750	10,400	5,110	1,570
5	3,000	3,940	5,530	7,210	9,200	12,980	15,020	12,980	13,640	10,200	4,900	1,510
6	3,150	3,940	5,600	7,210	9,400	13,310	15,020	12,980	13,530	9,900	4,780	1,452E
7	3,150	4,000	5,680	7,300	9,500	13,420	15,140	12,980	13,420	9,600	4,675E	1,404E
8	3,150	4,060	5,760	7,390	9,600	13,530	15,140	12,870	13,310	9,400	4,570E	1,356E
9	3,150	4,060	5,760	7,480	9,600	13,640	15,140	12,870	13,200	9,100	4,465E	1,308E
10	3,100	4,120	5,840	7,480	9,600E	13,640	15,140	12,760	13,090	8,830	4,360E	1,260E
11	3,100	4,120	5,920	7,570	9,701E	13,750	15,020	12,650	12,870	8,650	4,255E	1,212E
12	3,100	4,180	6,000	7,660	9,700E	13,860	15,020	12,540	12,760	8,380	4,150E	1,164E
13	3,160	4,240	6,000	7,750	9,800	13,860	14,900	12,430	12,650	8,200	4,045E	1,116E
14	3,160	4,300	6,080	7,840	9,800E	13,970	14,780	12,430	12,510	8,110	3,940	1,068E
15	3,160	4,420	6,080	7,840	9,800E	13,970	14,660	12,430	12,320	8,020	3,777E	1,020E
16	3,160	4,480	6,160	7,930	9,900E	13,970	14,510	12,540	12,000	7,840	3,620E	972E
17	3,220	4,540	6,160	7,930	9,900E	14,080	14,510	12,760	11,800	7,750	3,463E	924E
18	3,220	4,540	6,240	7,930	9,900E	14,080	13,970	12,980	11,700	7,660	3,305E	876E
19	3,280	4,600	6,320	8,020	10,000E	14,190	13,860	13,200	11,500	7,480	3,148E	828E
20	3,340	4,660	6,400	8,020	10,000	14,190	13,640	13,420	11,400	7,300	2,991E	780E
21	3,340	4,720	6,400	8,110	10,000E	14,190	13,530	13,420	11,300	7,120	2,834E	732E
22	3,400	4,780	6,400	8,110	10,100E	14,300	13,530	13,640	11,100	6,940	2,677E	684E
23	3,460	4,780	6,490	8,200	10,100E	14,300	13,420	13,750	11,900	6,850	2,520	636E
24	3,520	4,840	6,580	8,200	10,200E	14,420	13,420	13,860	11,800	6,670	2,432E	588E
25	3,580	4,900	6,580	8,290	10,200E	14,510	13,420	14,080	11,800	6,670	2,344E	540E
26	3,580	5,040	6,670	8,290	10,200	14,510	13,310	14,080	11,800	6,580	2,256E	492E
27	3,640	5,110	6,760	8,290	10,200E	14,660	13,310	14,190	11,800	6,490	2,168E	444E
28	3,640	5,180	6,760	8,290	10,200E	14,660	13,310	14,190	11,800	6,400	2,080E	396E
29	3,700	5,180	6,850	8,380		14,780	13,310	14,190	11,800	6,240	1,990	348E
30	3,760	5,250	6,850	8,380		14,780	13,090	14,190	11,800	6,000	1,960	300
31	3,760		6,940	8,470		14,780		14,080		5,840	1,870	

E - Estimated

SURPRISE VALLEY WATERMASTER SERVICE AREA

The Surprise Valley service area is in Modoc County, east of the Warner Mountains. Eleven individual stream systems rising on the eastern slope of the Warner Mountains supply water to the area. These are fed by snowmelt runoff and run in fast, steep courses down the eastern slope of the Warner Mountains to the valley floor where numerous scattered diversion ditches convey water to the irrigated lands.

Pine Creek, southeast of Alturas, was included in the Surprise Valley watermaster service area in 1988.

Basis of Service

The Surprise Valley watermaster service area was created January 10, 1939, and includes Mill, Soldier, Pine, Cedar, Deep, Owl, Rader, and Emerson Creeks, all of which once had individual watermaster service. Also, service was started on Eagle Creek at that time. Bidwell Creek was added to the service area March 16, 1960, and Cottonwood Creek was added in 1977. Each of the eleven stream systems in Surprise Valley is under separate decrees.

The Pine Creek agreement established water rights for Pine Creek, which is located on the west slope of the Warner Range, on November 22, 1933. This stream was added to the South Fork Pit River area on January 22, 1935. Pine Creek Reservoir, a small reservoir above all diversions, was originally used for power generation. Now a recreation site, it has a small water right but is not in the service area. Pine Creek was added to the North Fork Pit River area on July 1, 1982 and changed to the Surprise Valley watermaster service area in 1988. The Pine Creek agreement established two priorities.

See Table 34, page 87, for specific data regarding the decrees and water rights on the individual creeks.

Water Supply

The water supply comes almost entirely from snowmelt, with only minor spring-fed flows occurring late in the season. Due to the steep eastern slope of the Warner Mountains, there are no likely storage sites on the service-area streams. Because of the lack of such regulatory storage, the available water supply at any specific diversion point may vary considerably within a few hours. Wide daily temperature changes cause great changes in the rate of snowmelt runoff. This situation is worsened by the relatively short, steep drainage area. Also, occasional summer thundershowers may cause a creek to discharge a flow of mammoth proportions for several hours. These flashes can cause considerable damage from washouts and debris deposition but are of such short duration that little or no beneficial use can be made of the water.

The water supply for Pine Creek is derived mostly from snowmelt runoff. Therefore, runoff is usually small in the early spring, increases to a peak in May as temperatures rise, and then gradually decreases throughout the remainder of the season. Water users supplement their irrigation supplies from other sources whenever possible.

Records of the daily mean discharge at several stream gaging stations within the service area are presented in Tables 35 through 47, pages 88 through 100.

Method of Distribution

Continuous-flow distribution is used on most creeks, but water is rotated among some users in accordance with either decree schedule or by mutual agreement.

Alfalfa and meadow hay, the major crops in the valley, are irrigated by sprinklers and wild flooding, although some lands depend upon subsurface irrigation. A few of these systems work by gravity, but most use pumps with the surface water supplemented by deep wells. Many additional acres have been put into production during the past few years through the use of deep wells. Only surface water supplies are under State watermaster service.

To facilitate distribution of irrigation water, construction of permanent diversion dams, headgates, and measuring devices has been encouraged in recent years. Although these structures do not solve the problems of discharge variation and debris deposition, they do help a lot to solve water measurement and distribution problems.

1991 Distribution

Watermaster service began in the Surprise Valley watermaster service area on March 19 and continued until September 30. Kevin L. Dossey, Assistant Engineer, Water Resources, was watermaster.

The 1991 irrigation season was surprisingly good in Surprise Valley. The Warner Mountains snowpack water equivalent was only 23 percent of the April 1 average on February 1, 1991. At that time, there were concerns that the season could be one of the driest ever. But the tremendous snowfall in late February and the ensueing "March Miracle" more than tripled the snowpack. The snowpack was 70 percent of normal on April 1 and continued to accumulate through the unseasonably cold and wet months of April and May. By May 1, the snowpack had increased to 110 percent of average for that date. Then, a storm on May 17 dumped up to 2 feet of snow on the Warners and the summer runoff picture looked very bright in comparison to three months earlier. Frequent summer thunderstorms kept 1991 precipitation totals above annual averages in Surprise Valley and the Pine Creek basin. Creek runoff totals were above normal with totals ranging from 120 to 230 percent of 1990 totals.

Bidwell Creek

Total stream runoff from April 1 through September 30 was 7,353 acre-feet. Full priority water was available from late May through late June. Flow on September 30 was 3.0 cfs.

Mill Creek

Total stream runoff from April 1 through September 30 was 4,896 acre-feet. Full priority water was available from May 15 to June 15. Flows dropped to second priorities only in early August and to first priorities only by September 1. Flow on September 30 was 1.5 cfs.

Soldier Creek

Total stream runoff from March 19 through September 30 was 3,290 acre-feet. Flows were high enough to fill all priorities from May 5 to June 4. At the end of the rotation period on June 19, flow was 8.5 cfs. Flow was down to first priority water only by August 1 and on September 30, flow was down to 0.9 cfs.

Pine Creek

Total stream runoff from March 20 to June 18 was 1,377 acre-feet. Rotation began March 30 when flow increased to 4 cfs. Slightly less than three rotations were completed. On June 7, streamflow reduced to 3.8 cfs and was distributed to Tracts 68 and 70. On June 14, flow had dropped to 1.8 cfs and was turned down the Cressler Ditch. Flow in the creek ceased by July 1.

Cedar Creek

Total stream runoff from April 1 through September 30 was 1,245 acre-feet. Some water was diverted from Thoms Creek to Cedar Creek in early April. Water

was rotated among second priority water users after June 11. On May 31, total streamflow dropped below 5 cfs and was turned to Tract 91. Flow on September 30 was 0.1 cfs.

Deep Creek

Total stream runoff from April 1 through September 30 was 3,360 acre-feet. Full priority water was available for the latter part of May and early June. By mid-June, only first priority water was available in South Deep Creek. On September 30, flow was 0.3 cfs in South Deep Creek and 0.2 cfs in North Deep Creek.

Cottonwood Creek

Total stream runoff from April 1 through September 30 was 4,028 acre-feet. Due to the low flows caused by cold April weather, water rotation between Tracts 243, 245, 246, and 109 didn't begin until May 2. Rotation ended July 7. Flow on July 7 was 15 cfs and by September 30, flow was 0.7 cfs.

Owl Creek

Total stream runoff from April 1 through September 30 was 4,417 acre-feet. Flow on September 30 was 1.1 cfs.

Rader Creek

Total stream runoff from April 1 through September 30 was 2,323 acre-feet. Water was diverted to the Cockrell Ditch from May 20 until July 18, a full month longer than in 1991. Flows dropped quickly in July and by late August, only first priority water was available. Flow on September 30 was 0.5 cfs.

Eagle Creek

Total stream runoff from April 1 through September 30 was 3,246 acre-feet. By the end of July, only first priority water was available. Flow on September 30 was 0.8 cfs.

Emerson Creek

Total stream runoff from April 1 through September 30 was 1,648 acre-feet. Only first and second priority water was available this year. Streamflow had reduced to first priority only by August 1. Flow on September 30 was 1.3 cfs.

Pine Creek Near Alturas

Total stream runoff from April 1 through September 30 was 8,134 acre-feet. Flow was less than 20 cfs in early May, but the May 17 storm which dumped 7 inches of snow on the valley floor and 2 feet on the mountains caused the flow to peak at 350 cfs on May 20. Streamflow in excess of irrigation needs was diverted to Dorris Reservoir until July 19. Reservoir storage increased from 27 percent of capacity on March 20 to 100 percent on May 28. Flow in Pine Creek on September 30 was 12 cfs.

TABLE 34

DECREES AND RELATED DATA - SURPRISE VALLEY STREAMS

Stream	Modoc County Superior Court Decree No.	Date	Type[a]	Service Area Created	No. of Water Right Holders	Total Cfs	Remarks
Bidwell	6420	1-13-60	S	3-16-60[b]	46	63.74	(Schedule 3) 3 priorities March 15-July 19. (Schedule 4) 5 priorities July 10-September 30. If no water passing version No. 23 September 30-March 14, 1st priority provisions of Schedule 4 apply
Mill	3024	12-19-31	CR	12-30-31	38	37.13	One priority on Brown Creek, tributary to Rutherford Creek, 7 priorities on Rutherford Creek, tributary to Mill Creek, 1st and 2nd for year-round use, 3rd and 4th April through September.
Soldier	2045	11-28-28	CR	9-11-29	13 4[c]	33.50 4.37	Starting March 19 each year, lower users receive water for 4 13-day periods alternating with upper users who receive water for 4 10-day periods, ending June 19. 7 priorities during lower users periods, 8 during upper users periods and 12 for rest of the year. Appropriative License 1566, 1613, 1648, and 1850.
Pine near Cedarville	3391	12-07-36	CR	1-13-37	5 1[c]	[d] 0.08	One full rotation totalling 693 AF. Rotation continues until flow decreases to 4 cfs, then all water goes to Cal-Vada Ranch until flow decreases to 1.60 cfs, then all water goes to the R. Bordwell Ranch.
Cedar	1206 2343 [d]	5-22-01 2-15-23	CA CA	9-11-29	12	28.90[d]	Water rights established by these two decrees and an agreement signed by all users. No. 1206 set 1st and 2nd priorities; No. 2443 3rd priority and agreement the 4th. 28.90 cfs includes 5.00 cfs imported from Thoms Creek on west slope of Warner Mountains.
Deep	3101	1-25-34	CR	12-29-34	11	29.37	Schedule 2 establishes 5 priorities, year-round.
Cottonwood	6903	12-01-64	CA	7-01-77[b]	8	[d]	Water rights based on a percentage of flow in an equal priority.
Owl	2410	5-29-29	CA	9-11-29	8	41.70	21 priorities; all year round but 8th priority, under which each of 3 owners receives his allotment for an 8-day period. Appropriative License No.2842, 3.54 cfs.
Rader	3626	6-04-37	CR	6-12-37	6	21.00	7 priorities. 7th is for surplus water. Diversions No. 1, 3, 6, and 7 have seasonal limitations.
Eagle	2304 3284	4-05-26 11-05-37	CA CR	1-10-39	36	30.57	Decree No. 3284 added rights in all priority classes, and established 4 classes. 4.50 cfs right of Betford Corp. is for use March 1 to July 1. Eagleville 'town users', Schedule 2 may divert through Gee & Grider ditches March 16 to October 14 each year. Set 1st priority rights of Gee & Grider ditches, Par. XVII & XVIII, for use April 15 to October 1.
Emerson	2840	3-25-30	CR	4-11-30	10	24.65	4 priorities, 1st is for year-round use, others April 1 to September 30.
Pine near Alturas[e]	----	11-22-33	A	1-22-35	16	60.00	Surplus flow into Doris Reservoir. Tributary to South Fork Pit River.

[a] S-Statutory, CR-Court Reference, CA-Court Adjudication, A-Agreement
[b] Added to existing Surprise Valley service area.
[c] Appropriative rights junior to the decreed rights.
[d] See remarks.
[e] Pine Creek is on the west slope of Warner Range near Alturas.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 35

1990 Daily Mean Discharge
(In cubic feet per second)

BIDWELL CREEK NEAR FORT BIDWELL

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	5.4	12	20	47	30	6.0	3.4
2	5.4	12	19	53	24	5.9	3.4
3	5.4	11	19	65	24	5.9	3.4
4	5.4	12	21	65	23	5.9	3.1
5	5.4	17	25	57	21	5.9	3.1
6	5.4	26	28	53	19	5.9	3.1
7	5.4	19	30	51	17	5.8	3.1
8	5.4	15	36	52	15	5.6	2.9
9	5.4	14	32	57	14	5.4	2.9
10	5.4	12	27	65	13	5.4	2.9
11	5.4	11	24	77	12	5.1	2.9
12	5.4	11	25	74	11	5.0	2.9
13	5.4	12	26	65	10	4.9	3.0
14	5.7	13	28	55	9.9	4.7	3.1
15	6.1	12	31	50	9.8	4.9	3.2
16	6.1	12	35	47	9.6	4.8	3.1
17	6.0	11	37	44	9.7	4.6	3.1
18	6.1	10	37	42	9.2	4.6	2.9
19	6.2	10	38	41	8.8	4.4	2.9
20	6.1	12	49	39	8.5	4.4	2.9
21	5.9	13	50	37	8.2	4.4	2.6
22	5.9	17	58	36	7.9	4.1	2.6
23	6.1	22	66	34	8.0	4.1	2.6
24	6.2	21	67	32	7.7	3.9	3.0
25	6.4	19	73	32	7.4	3.9	3.0
26	6.2	17	59	30	7.4	3.6	3.1
27	6.3	16	54	31	7.1	3.6	3.1
28	6.9	17	51	33	6.9	3.6	3.1
29	8.0	19	51	33	6.6	3.6	3.1
30	9.3	20	51	32	6.4	3.6	3.0
31	11		47		6.1	3.5	
MEAN	6.2	14.8	39.2	47.6	12.3	4.7	3.0
AC-FT	378	883	2408	2834	756	292	180

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 36

1991 Daily Mean Discharge
(In cubic feet per second)

MILL CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		11[1/]	14	32	17	3.4	1.9
2		10	14	36	17	3.4	1.9
3		10	13	39	17	4.0	1.9
4		11	14	38	16	4.3	1.8
5		15	17	33	15	3.4	1.8
6		23	20	31	14	3.4	1.6
7		17	23	32	13	3.1	1.6
8		14	25	33	13	3.0	1.6
9		13	21	36	11	3.0	1.6
10		11	19	39	11	3.0	1.8
11		10	18	40	11	2.9	1.8
12		8.8	19	39	10	2.9	1.8
13		10	23	34	9.0	2.9	1.6
14		10	26	33	8.7	2.9	1.6
15		10	27	31	8.7	2.9	1.6
16		9.0	27	27	8.5	2.8	1.6
17		8.7	26	25	8.5	2.7	1.5
18		8.7	26	24	8.0	2.7	1.5
19		8.8	27	23	7.5	2.6	1.5
20		9.0	31	22	6.9	2.5	1.4
21		11	35	22	5.9	2.4	1.5
22		17	39	21	5.9	2.2	1.5
23		19	40	20	5.9	2.1	1.5
24		15	44	19	5.4	2.1	1.5
25		14	44	20	5.0	2.1	1.5
26		14	39	19	5.0	2.1	1.5
27		13	34	19	4.6	2.1	1.5
28		13	33	19	4.3	2.1	1.5
29		14	32	20	4.3	2.1	1.5
30		14	33	19	4.0	2.1	1.5
31			30		4.0	2.1	
MEAN		12.4	26.9	28.2	9.2	2.8	1.6
AC-FT		738	1652	1676	565	169	96

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 37

1991 Daily Mean Discharge
(In cubic feet per second)

SOLDIER CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		10	13	23	5.5	1.7	1.1
2		8.3	12	28	5.3	1.7	1.1
3		8.1	12	30	5.0	1.7	1.1
4		10	14	21	4.6	1.9	1.0
5		14	21	16	4.3	1.7	1.0
6		24	21	15	4.3	1.7	1.0
7		13	28	15	3.8	1.7	0.9
8		9.9	30	18	3.5	1.6	0.9
9		9.5	19	19	3.3	1.6	0.9
10		7.4	14	20	3.2	1.6	1.0
11		5.9	12	20	2.9	1.5	1.0
12		6.8	17	16	2.9	1.5	0.9
13		7.7	23	14	2.7	1.5	1.0
14		10	23	12	2.7	1.7	0.9
15		9.1	23	10	2.8	1.7	0.9
16		7.6	25	9.9	2.6	1.5	0.9
17		7.0	23	8.9	2.4	1.5	0.9
18		6.8	20	8.5	2.3	1.5	0.9
19	2.8[1/]	7.9	21	8.5	2.4	1.4	1.0
20	2.8	9.3	31	7.6	2.3	1.4	0.9
21	2.9	11	33	7.2	2.2	1.3	1.0
22	3.1	21	41	7.0	2.1	1.1	1.0
23	3.2	21	40	6.8	2.1	1.1	0.9
24	3.2	14	40	6.6	2.1	1.1	0.9
25	3.2	12	34	6.6	2.1	1.1	0.9
26	3.2	12	25	6.1	2.1	1.1	0.9
27	3.3	11	23	6.1	1.9	1.1	0.9
28	3.8	12	21	6.1	1.9	1.1	0.9
29	4.5	14	21	6.4	1.8	1.3	0.9
30	6.6	13	25	5.3	1.7	1.3	0.9
31	8.5		21		1.7	1.1	
MEAN	3.9	11.1	23.4	12.8	2.9	1.4	1.0
AC-FT	101	661	1440	763	180	88	57

[1/] No record before March 19.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 38

1991 Daily Mean Discharge
(In cubic feet per second)

PINE CREEK NEAR CEDARVILLE AT DIVERSION OF NORTH AND SOUTH CHANNELS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		9.6	9.1	6.3			
2		10	9.3	6.0			
3		9.6	9.5	5.7			
4		11	9.7	4.9			
5		18	10	4.3			
6		22	11	4.2			
7		17	11	3.8			
8		11	12	3.1			
9		9.4	10	2.7			
10		7.4	7.4	2.5			
11		6.1	6.9	2.3			
12		5.6	7.1	2.1			
13		5.9	10	2.0			
14		7.1	10	1.8			
15		8.0	9.2	1.6			
16		6.3	8.5	1.6			
17		5.7	9.5	1.5			
18		5.6	9.3	1.4			
19		5.9	9.7	1.4			
20	1.8[1/]	6.0	16	1.3			
21	1.7	6.2	18	1.2			
22	1.6	6.9	18	1.1			
23	1.5	12	14	1.0			
24	1.5	12	13	0.8			
25	1.5	10	11	0.6			
26	1.5	10	8.5	0.5			
27	1.7	10	7.2	0.3			
28	2.0	10	6.5	0.3			
29	2.5	13	6.0	0.2			
30	4.0	10	8.5	0.1[1/]			
31	5.2		7.7				
MEAN	2.2	9.6	10.1	2.2			
AC-FT	53	570	622	132			

[1/] No record before March 20 and no flow after June 30.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 39

1991 Daily Mean Discharge
(In cubic feet per second)

CEDAR CREEK AT CEDARVILLE

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	0.7	5.0	6.9	4.0	1.4	0.5	0.1
2	0.7	4.7	8.3	4.1	1.3	0.4	0.2
3	2.0	6.2	8.1	3.9	1.2	0.4	0.2
4	56 E	5.3	7.1	3.4	1.6	0.4	0.2
5	7.8	10	7.3	2.8	1.2	0.6	0.1
6	4.1	43 E	7.2	2.6	1.3	0.6	0.1
7	3.3	12	7.3	2.2	1.1	0.4	0.1
8	3.1	7.6	8.9	2.4	1.0	0.4	0.1
9	2.8	6.1	7.5	2.3	1.1	0.4	0.1
10	2.6	4.8	6.4	2.1	1.0	0.5	0.2
11	2.4	4.3	5.7	2.0	1.2	0.4	0.1
12	2.3	3.9	7.1	2.1	0.9	0.3	0.1
13	2.2	3.9	9.1	1.9	0.9	0.3	0.1
14	2.2	4.0	9.5	1.9	1.3	0.3	0.1
15	2.1	4.1	8.5	1.9	1.0	0.4	0.1
16	2.0	3.8	11	1.8	0.9	0.4	0.1
17	2.0	3.7	9.0	1.7	0.9	0.3	0.1
18	2.0	3.7	6.8	1.6	1.1	0.3	0.1
19	2.1	3.5	7.7	1.7	1.1	0.3	0.1
20	2.1	3.7	21	1.8	0.9	0.3	0.1
21	2.0	4.2	26 E	1.5	0.8	0.3	0.1
22	2.1	6.4	25	1.9	0.9	0.2	0.1
23	2.1	8.4	19	1.5	0.8	0.2	0.1
24	2.1	6.4	16	1.6	0.7	0.2	0.1
25	2.2	6.5	12	1.6	0.8	0.3	0.1
26	2.3	7.4	8.5	1.5	0.6	0.2	0.1
27	2.4	8.0	6.7	1.7	0.6	0.2	0.1
28	2.6	8.2	5.4	1.6	0.6	0.2	0.1
29	3.0	9.4	5.7	1.7	0.5	0.2	0.1
30	3.6	6.9	5.7	1.9	0.5	0.1	0.1
31	4.6		4.2		0.5	0.1	
MEAN	4.3E	7.2E	9.8E	2.2	1.0	0.3	0.1
AC-FT	265 E	427 E	604 E	128	59	20	7

E - Estimated

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 40

1991 Daily Mean Discharge
(In cubic feet per second)

NORTH DEEP CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		4.5[1/]	5.4	10	1.8	0.5	0.2
2		4.4	5.4	10	1.6	0.5	0.2
3		4.9	5.4	10	1.5	0.5	0.2
4		5.0	5.3	10	1.4	0.5	0.2
5		6.1	5.7	10	1.3	0.5	0.2
6		10	5.9	9.9	1.2	0.4	0.2
7		6.1	6.4	10	1.1	0.4	0.2
8		5.2	6.7	10	1.1	0.4	0.2
9		4.7	6.0	10	1.0	0.4	0.2
10		4.2	5.4	10	1.0	0.4	0.3
11		3.3	4.9	9.9	0.9	0.3	0.3
12		3.0	5.6	8.3	0.8	0.3	0.3
13		3.0	6.5	7.6	0.8	0.3	0.3
14		3.4	6.9	6.7	0.7	0.3	0.2
15		3.5	6.7	6.0	0.6	0.3	0.2
16		3.4	7.0	5.4	0.7	0.3	0.2
17		3.3	7.2	4.9	0.7	0.3	0.2
18		3.1	7.4	4.2	0.7	0.3	0.2
19		3.2	8.0	3.9	0.7	0.3	0.2
20		3.7	10	3.6	0.7	0.3	0.2
21		4.2	10	3.1	0.6	0.2	0.2
22		5.6	10	2.9	0.6	0.2	0.2
23		6.5	10	2.6	0.6	0.2	0.2
24		6.2	10	2.4	0.6	0.2	0.2
25		5.9	10	2.4	0.6	0.2	0.2
26		6.1	10	2.1	0.6	0.2	0.2
27		5.9	10	2.5	0.6	0.2	0.2
28		5.6	10	2.2	0.6	0.2	0.2
29		5.5	10	2.5	0.6	0.2	0.2
30		5.4	10	2.1	0.5	0.2	0.2
31			10		0.5	0.2	
MEAN		4.8	7.7	6.2	0.9	0.3	0.2
AC-FT		287	472	367	53	19	13

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 41

1991 Daily Mean Discharge
(In cubic feet per second)

SOUTH DEEP CREEK BELOW NO. 2 DIVERSION

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		7.2[1/]	9.1	16	2.8	0.8	0.4
2		7.1	9.1	18	2.5	0.8	0.4
3		7.7	9.1	19	2.4	0.8	0.4
4		7.9	8.9	18	2.2	0.8	0.4
5		11	9.8	16	2.1	0.7	0.4
6		24	10	15	2.0	0.7	0.4
7		11	11	16	1.8	0.6	0.4
8		8.4	12	17	1.8	0.6	0.3
9		7.4	10	18	1.7	0.6	0.3
10		6.8	9.1	18	1.6	0.6	0.5
11		5.4	7.7	15	1.5	0.5	0.5
12		4.5	9.6	12	1.4	0.5	0.5
13		4.5	12	11	1.3	0.5	0.5
14		5.7	13	9.7	1.2	0.5	0.4
15		5.8	12	8.8	1.1	0.5	0.4
16		5.7	13	8.0	1.2	0.5	0.4
17		5.4	14	7.2	1.2	0.5	0.4
18		4.8	15	6.3	1.2	0.5	0.4
19		5.1	18	5.8	1.2	0.5	0.4
20		6.1	25	5.4	1.3	0.5	0.4
21		6.8	25	4.8	1.1	0.4	0.4
22		9.6	25	4.5	1.0	0.4	0.4
23		12	24	4.2	1.0	0.4	0.3
24		11	23	3.9	1.0	0.4	0.3
25		10	21	3.9	0.9	0.4	0.3
26		11	18	3.4	0.9	0.4	0.3
27		10	18	4.1	0.9	0.4	0.3
28		9.6	18	3.5	0.9	0.4	0.3
29		9.3	18	4.1	0.9	0.4	0.3
30		9.1	18	3.3	0.8	0.4	0.3
31			16		0.8	0.4	
MEAN		8.3	14.9	10.0	1.4	0.5	0.4
AC-FT		496	915	595	87	33	23

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER AREA

TABLE 42

1991 Daily Mean Discharge
(In cubic feet per second)

COTTONWOOD CREEK FLUME BELOW PAGE DITCH

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		5.5[1/]	6.3	30	19	2.9	1.0
2		5.5	6.9	26	19	2.9	1.0
3		5.8	6.0	36	22	2.9	1.0
4		6.0	7.6	34	21	2.7	1.1
5		6.0	13	30	20	3.0	1.3
6		16	14	26	17	2.9	1.2
7		9.1	18	27	15	2.5	1.0
8		7.3	17	30	10	2.4	1.1
9		6.6	14	34	13	2.2	1.1
10		6.6	12	34	10	2.1	1.3
11		6.9	11	35	9.4	1.9	1.1
12		5.8	13	41	9.4	1.9	1.0
13		6.0	14	47	8.7	1.7	0.9
14		6.6	13	52	8.7	1.7	1.1
15		6.6	13	40	8.0	1.8	0.9
16		6.6	16	36	8.0	1.9	0.9
17		6.6	15	31	7.4	1.6	0.7
18		6.3	15	28	6.9	1.5	0.7
19		6.3	14	28	5.9	1.5	0.6
20		6.6	18	26	7.4	1.5	0.7
21		6.3	18	24	6.3	1.4	0.8
22		7.3	17	22	5.0	1.4	0.7
23		9.4	33	21	4.6	1.2	0.7
24		8.9	34	21	4.6	1.2	0.7
25		6.9	39	19	5.0	1.2	0.7
26		6.6	38	19	4.6	1.2	0.7
27		6.6	34	19	4.6	1.2	0.7
28		5.8	26	19	3.6	1.2	0.7
29		5.2	25	21	3.3	1.2	0.7
30		5.2	25	19	3.2	1.2	0.7
31			26		3.0	1.1	
MEAN		6.9	18.4	29.2	9.5	1.8	0.9
AC-FT		410	1134	1736	582	113	53

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 43

1991 Daily Mean Discharge
(In cubic feet per second)

OWL CREEK BELOW ALLEN-ARRECHE DITCH

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		8.4[1/]	11	21	19	5.3	1.4
2		7.4	11	23	20	5.3	1.4
3		7.9	9.0	34	19	5.3	1.4
4		9.0	10	41	19	5.3	1.4
5		13	12	35	17	5.3	1.4
6		19	13	38	16	5.3	1.5
7		9.8	18	40	15	4.9	1.5
8		7.9	20	41	15	4.4	1.3
9		7.9	13	43	13	4.3	1.3
10		6.9	12	43	12	3.8	1.6
11		5.1	11	47	13	3.3	1.5
12		4.5	13	43	13	2.9	1.4
13		5.7	14	49	13	2.5	1.3
14		6.9	14	49	13	2.2	1.3
15		7.4	15	43	11	1.9	1.3
16		9.8	17	40	8.6	1.8	1.2
17		8.4	17	40	10	1.6	1.2
18		6.9	15	38	10	1.6	1.2
19		6.9	15	28	9.6	1.6	1.2
20		6.9	20	25	9.6	1.5	1.2
21		6.9	20	22	10	1.5	1.1
22		9.8	21	21	8.2	1.4	1.1
23		12	23	20	6.8	1.3	1.1
24		11	23	20	5.8	1.3	1.1
25		11	25	18	5.8	1.3	1.1
26		11	23	20	5.3	1.4	1.1
27		10	22	22	5.3	1.4	1.1
28		9.8	22	20	5.8	1.5	1.1
29		10	22	22	5.8	1.5	1.1
30		9.8	23	21	5.3	1.4	1.1
31			20		5.3	1.4	
MEAN		8.9	16.9	32.2	11.1	2.8	1.3
AC-FT		530	1039	1918	685	170	75

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 44

1991 Daily Mean Discharge
(In cubic feet per second)

RADER CREEK BELOW COCKRELL DIVERSION

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		1.5[1/]	4.3	12	13	2.1	0.6
2		1.5	4.3	13	13	2.1	0.6
3		1.5	4.3	14	13	2.1	0.6
4		2.0	4.3	14	13	2.0	0.6
5		3.8	4.5	13	13	2.0	0.6
6		6.1	4.8	13	13	2.0	0.6
7		3.3	9.6	16	12	2.0	0.6
8		2.9	10	17	11	1.5	0.6
9		2.9	8.4	27	10	1.5	0.6
10		2.4	6.1	30	8.4	1.5	0.6
11		2.1	4.8	33	7.6	1.5	0.6
12		2.1	5.4	27	6.8	1.5	0.6
13		2.4	6.1	27	6.1	1.5	0.6
14		2.4	6.1	27	5.4	1.5	0.6
15		2.4	8.4	23	5.4	1.5	0.6
16		2.6	9.6	23	4.8	1.5	0.6
17		2.9	9.6	23	4.8	1.5	0.6
18		2.9	8.4	27	4.5	1.5	0.6
19		3.1	7.6	17	4.3	1.5	0.6
20		3.1	9.2	16	4.3	1.1	0.6
21		3.1	10	16	4.0	1.1	0.6
22		3.1	12	14	3.8	1.1	0.6
23		3.3	13	14	3.8	1.1	0.6
24		3.8	13	14	3.6	1.1	0.6
25		3.8	13	13	3.3	1.1	0.6
26		3.6	13	13	3.1	1.1	0.5
27		3.6	12	13	2.9	1.1	0.5
28		3.8	12	13	2.6	1.1	0.5
29		4.0	12	13	2.4	1.1	0.5
30		4.0	12	13	2.4	1.1	0.5
31			11		2.1	1.1	
MEAN		3.0	8.7	18.3	6.7	1.3	0.6
AC-FT		179	533	1087	411	78	35

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 45

1991 Daily Mean Discharge
(In cubic feet per second)

EAGLE CREEK NEAR EAGLEVILLE

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		2.2[1/]	4.4	14	21	2.0	1.3
2		2.2	4.4	19	23	1.8	1.2
3		2.2	4.4	24	25	1.8	1.2
4		2.2	4.4	31	25	2.0	0.9
5		4.4	4.8	25	23	1.8	0.9
6		7.2	5.2	23	21	1.8	0.9
7		5.0	8.9	23	18	1.8	0.9
8		4.8	10	23	16	1.8	0.9
9		4.2	10	30	15	2.0	0.9
10		4.0	8.4	46	13	2.1	1.2
11		4.0	6.5	54	13	2.0	1.3
12		3.0	6.1	54	11	2.0	1.2
13		3.6	5.7	47	11	1.8	1.2
14		4.0	6.1	34	10	1.8	1.2
15		4.0	5.7	29	9.5	1.8	1.2
16		3.0	6.5	29	8.2	1.8	1.2
17		2.8	8.4	26	7.5	1.8	0.9
18		3.6	8.2	25	7.2	2.1	0.8
19		2.8	7.5	24	6.0	1.8	0.9
20		2.3	7.5	22	6.3	1.8	0.8
21		2.8	7.5	19	5.5	1.8	0.8
22		3.0	10	21	4.9	1.7	0.8
23		3.6	14	22	3.6	1.7	0.8
24		4.0	23	20	4.7	1.7	0.8
25		3.3	23	20	3.2	1.7	0.8
26		3.3	22	21	2.8	1.7	0.8
27		3.0	20	21	2.8	1.7	0.8
28		3.0	18	20	2.5	1.5	0.8
29		4.0	17	20	2.0	1.3	0.8
30		4.6	15	19	2.0	1.3	0.8
31			13		2.0	1.3	
MEAN		3.5	10.2	26.8	10.5	1.8	1.0
AC-FT		210	626	1597	646	109	58

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 46

1991 Daily Mean Discharge
(In cubic feet per second)

EMERSON CREEK ABOVE ALL DIVERSIONS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1		3.6[1/]	4.9	10	5.5	2.1	1.6
2		3.6	4.9	9.6	4.8	2.1	1.6
3		3.4	4.9	8.8	4.1	1.9	1.6
4		3.6	5.0	11	4.1	2.1	1.6
5		3.9	6.8	12	3.9	2.1	1.6
6		12	6.8	11	3.8	2.1	1.6
7		7.4	9.6	10	3.8	1.9	1.6
8		4.7	12	8.8	3.6	1.9	1.6
9		4.6	8.8	8.8	3.6	1.9	1.6
10		4.5	6.8	8.1	3.6	1.8	1.7
11		4.4	5.0	8.8	3.6	1.8	1.7
12		4.5	5.0	11	3.4	1.8	1.6
13		4.5	6.8	12	3.2	1.7	1.6
14		4.6	5.0	11	3.2	1.7	1.6
15		4.7	6.8	11	3.2	1.7	1.6
16		4.6	6.8	10	3.0	1.7	1.4
17		4.5	6.8	9.6	3.0	1.7	1.4
18		4.5	5.0	9.6	2.8	1.7	1.4
19		4.5	5.0	8.8	2.8	1.7	1.3
20		4.6	6.8	8.1	3.4	1.7	1.3
21		4.6	7.4	7.4	3.2	1.7	1.2
22		4.7	9.6	6.8	3.0	1.7	1.2
23		4.9	8.8	6.5	2.8	1.7	1.2
24		5.0	6.8	6.3	2.8	1.6	1.2
25		4.9	8.1	6.0	2.6	1.6	1.2
26		4.9	7.4	6.0	2.4	1.6	1.2
27		4.6	8.8	6.0	2.2	1.6	1.2
28		4.7	9.6	6.0	2.2	2.2	1.3
29		4.9	10	6.1	2.1	1.3	1.3
30		4.9	9.6	6.1	2.1	2.2	1.3
31			9.6		2.1	1.6	
MEAN		4.8	7.3	8.7	3.2	1.8	1.4
AC-FT		287	447	517	198	113	86

[1/] No record before April 1.

SURPRISE VALLEY WATERMASTER SERVICE AREA

TABLE 47

1991 Daily Mean Discharge
(In cubic feet per second)

PINE CREEK NEAR ALTURAS

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	11	12	17	39	24	15	13
2	11	12	39	40	24	15	13
3	12	12	23	41	23	15	13
4	20	12	17	41	23	15	13
5	19	12	17	43	23	15	13
6	15	12	17	46	23	15	13
7	14	12	17	48	22	14	12
8	13	12	18	49	21	14	12
9	12	12	17	50	21	14	12
10	12	12	17	54	20	14	13
11	12	12	16	61	21	14	12
12	12	12	17	64	20	14	12
13	13	13	20	65	20	14	12
14	14	13	30	61	19	14	12
15	15	13	21	55	19	14	12
16	14	13	20	48	18	14	12
17	16	13	52	42	18	14	12
18	17	13	47	40	18	13	12
19	18	13	76	38	18	13	12
20	16	13	208E	36	18	13	12
21	14	13	50	33	17	13	12
22	13	13	39	30	17	13	12
23	12	13	34	28	17	13	12
24	12	13	33	28	17	13	12
25	12	13	33	28	16	13	12
26	13	18	31	26	16	13	12
27	13	18	29	25	16	13	12
28	13	16	29	25	16	13	12
29	12	16	31	28	16	13	12
30	12	16	33	26	15	13	12
31	12		34		15	13	
MEAN	13.7	13.2	34.9E	41.3	19.1	13.7	12.2
AC-FT	841	787	2146 E	2456	1172	845	728

E - Estimated

SUSAN RIVER WATERMASTER SERVICE AREA

The Susan River service area is in southern Lassen County near Susanville. The main area of water use is in Honey Lake Valley between Susanville and the northwest shore of Honey Lake, a stretch of about 25 miles. The valley floor is at an elevation of about 4,000 feet. Water comes from three stream systems: Susan River, Baxter Creek, Parker Creek, and their respective tributaries.

The Susan River originates in the Cascade Range just east of Lassen National Park at an elevation of about 7,900 feet. It runs east from Silver Lake through McCoy Flat Reservoir, the town of Susanville, and then to Honey Lake.

The river has four major tributaries: Piute Creek, entering from the north at Susanville; Gold Run and Lassen Creeks, entering from the south between Susanville and Johnstonville; and Willow Creek, entering from the north above Standish. Gold Run and Lassen Creeks rise on the north slope of Diamond Mountain at an elevation of about 7,600 feet. The watersheds of Piute and Willow Creeks are on the south slopes of Round Valley Mountain at lower elevations.

The Susan River divides into three channels, a short distance below its confluence with Willow Creek. The channels are Tanner Slough Channel on the north, Old Channel in the middle, and Dill Slough Channel on the south. Hartson Slough and Whitehead Slough divert from Dill Slough on its south bank, further downstream.

The Baxter Creek stream system is in Honey Lake Valley on the east side of the Sierra Nevada, about 10 miles southeast of Susanville. The main creeks in the system are Baxter Creek, which rises on the west side of the basin and flows east, and Elysian, Sloss, and Bankhead Creeks, tributaries of Baxter Creek from the south.

Parker Creek is also in Honey Lake Valley on the east slope of the Sierra Nevada, about 15 miles southeast of Susanville. It rises on the east side of Diamond Mountain and flows east for about 5 miles into Honey Lake.

Basis of Service

The water of Susan River and its tributaries is distributed according to the water rights defined in Decree No. 4573, Lassen County Superior Court, entered on April 18, 1940. Schedule 3 of the decree defines the rights to the use of water from Willow Creek in Willow Creek Valley, Lower Willow Creek, and the Susan River delta below the Colony Dam. Schedule 4 of the decree defines the rights to the use of water from Gold Run, Piute, Hills, Holtzclaw, and Lassen Creeks above their confluence with the Susan River. Schedules 5 and 6 of the decree define the rights to the use of water from the Susan River, exclusive of its tributaries. The decree establishes three priority classes each on Susan River and Gold Run Creek, two on Willow Creek, and one each on Piute and Hills Creeks.

The water of Baxter Creek and its tributaries is distributed according to the water rights defined in the statutory adjudication as set forth in Decree No. 8174, Lassen County Superior Court, dated December 15, 1955. Schedule 3 of the decree defines the rights to the use of water from Sloss and Bankhead Creeks, and Schedule 4 defines the rights to the use of water from Baxter and Elesian Creeks. The Baxter Creek rights are divided into five priority classes.

The water of Parker Creek and its tributaries is distributed according to the water rights defined by a statutory adjudication as set forth in Decree No. 8175, Lassen County Superior Court, dated December 15, 1955. Schedule 3 of the decree defines the rights to the use of water from Parker Creek, with four priority classes.

The Susan River watermaster service area was created by order of the Division of Water Resources on November 10, 1941. The Baxter and Parker Creek stream systems were added to the Susan River service area on February 16, 1956.

Water Supply

Water in the Susan River service area comes from two major sources: snowmelt runoff and springs. Snowpack in the Willow Creek Valley and Piute Creek watersheds, which contain more than half the Susan River stream system, melts early in the spring and is usually depleted by May 1. Irrigation requirements from this part of the stream system are then almost entirely dependent on the flow of springs that are relatively constant throughout the year.

Under average flow conditions, Lassen, Gold Run, Baxter, and Parker Creeks and the Susan River above Susanville are sustained by snowmelt runoff until early June. The flow from perennial springs in this portion of the system is comparatively small.

The Lassen Irrigation Company stores supplemental water in Hog Flat and McCoy Flat Reservoirs, on the headwaters of the Susan River. This stored water is released into the Susan River Channel and joins the natural flow, usually during June and July. It is then rediverted into Lake Leavitt for further distribution by the irrigation company.

Records of daily mean discharge of the several stream gaging stations in the service area are presented in Tables 48 through 57, pages 105 through 114.

Method of Distribution

A major portion of the irrigation in the Susan River service area is done by flooding. Water is supplied to the area from the Susan River, tributaries to the river, and other minor streams. The distribution of water is provided by a system of diversion dams, canals and ditches. Included in the operation of the service area are three reservoirs owned and operated by the Lassen Irrigation Company which are McCoy Flat Reservoir, Hog Flat Reservoir, and Lake Leavitt.

1991 Distribution

This is the 50th annual report on watermaster service in the Susan River watermaster service area and covers the period of distribution beginning March 1 and continuing until November 1. Virgil D. Buechler, Water Resources Engineering Associate, was the watermaster.

Streamflow conditions for the service area were at a most severe drought level for 1991, the fifth consecutive year. The 1991 runoff at the USGS gaging station, "Susan River at Susanville," was 23 percent of normal.

Parker Creek

First priority water rights were served through March and then dried up to a spring-fed trickle for the upper users.

Baxter Creek

A minimum flow to start the season on March 1 of 0.1 cfs gradually increased to 1.5 cfs above the Boys Camp April 29. It dried up at the Long Ditch diverson on April 8, 1991.

Hills Creek

The water supply in Hills Creek was insufficient to fill Emerson Lake.

Gold Run Creek

At the beginning of the season the streamflow only provided 16 percent of the water rights. On April 6 the available flow reached its maximum for the season of 24 cfs or 150 percent of the water rights. The streamflow then gradually decreased to 0.1 cfs on August 10 and remained until October 7 which was the end of the record.

Piute Creek

The spring-fed water supply was sufficient to satisfy all allotments and provide most of the first priority to the Old Channel users.

Susan River

The flow in the Susan River decreased to 4 cfs or first priority June 22 after McCoy Flat storage water was depleted. The streamflow then decreased to a minimum of 0.30 cfs on August 12, the lowest flow of the season.

Lassen Irrigation Company Reservoirs

McCoy Flat measured inflow was 372 acre-feet for the period April 23 to May 18. McCoy Flat released a total of 412 acre-feet from April 25 through May 13 when it dried up. Hog Flat Reservoir released a total of 428 acre-feet during the period May 7 through May 23 when it dried up.

Lower Susan River Below the Confluence of Willow Creek

The total flow in the Lower Susan River below Willow Creek exceeded 10 cfs until June 16 and then remained above 4 cfs for the remainder of the season.

Lassen Holtzslaw Creek

Lassen Creek had a flow of one cfs on April 8. The creek flow provided only stock water for a short period this summer.

Willow Creek

The flow in Willow Creek above Murres Diversion was measured at 12.3 cfs April 23 and 11.9 cfs August 5. The Neuhaus-Jacob ditch had a continuous flow of 2.1 cfs during the period from April 1 to October 31.

The lower Schedule 3 users received their percentage of second priority water for the summer.

Flow of Mapes Big Springs. To determine the flow of Mapes Big Springs, a gaging station with a 5-foot parshall flume was operated in 1991 by DWR. This station, "Willow Creek (above Mapes Big Springs) near Susanville," is above Mapes Big Springs and is located 1.7 miles above the USGS gaging station "Willow Creek near Susanville." The difference in the mean daily cubic feet per second of these two stations is the flow of Mapes Big Springs in this 1.7 mile reach.

The flow at Willow Creek near the Susanville USGS gaging station and Willow Creek (above Mapes Big Springs) near Susanville is presented in Tables 52 and 53.

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 48

1991 Daily Mean Discharge
(In cubic feet per second)

SUSAN RIVER AT SUSANVILLE[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	13	85	51	32	4.4	0.9	1.3
2	42	78	45	29	3.3	0.3	1.4
3	290	77	44	26	3.4	0.9	1.4
4	192	80	41	23	5.7	1.2	1.3
5	65	89	45	19	4.8	1.4	1.5
6	41	469	48	19	3.5	1.3	1.5
7	31	180	51	17	2.8	1.0	0.8
8	28	110	137	16	2.8	0.8	1.1
9	25	89	152	15	2.3	1.0	1.5
10	21	80	142	13	1.9	1.2	1.3
11	21	65	133	9.8	1.6	0.8	1.1
12	21	58	91	9.3	1.6	0.3	1.4
13	19	56	74	9.2	1.5	1.1	1.4
14	19	59	74	7.8	1.5	1.5	1.4
15	17	61	70	8.3	1.6	3.6	1.4
16	20	56	65	8.2	1.7	1.0	1.5
17	21	51	77	7.7	1.7	1.4	1.4
18	24	48	78	7.1	1.8	1.1	1.2
19	26	46	77	6.8	1.0	1.0	1.0
20	25	51	75	6.8	4.1	1.3	1.1
21	24	54	69	5.0	12	1.3	2.0
22	23	51	63	4.0	2.6	1.3	2.1
23	22	56	56	4.1	2.7	0.9	1.7
24	24	62	53	3.8	2.0	1.2	1.8
25	23	65	52	5.5	2.1	1.3	1.9
26	23	56	52	7.0	2.1	1.0	2.1
27	23	57	48	5.3	2.3	1.2	1.8
28	39	56	43	6.5	1.5	1.5	2.3
29	57	55	38	9.2	1.2	1.6	2.2
30	64	53	41	6.1	1.4	1.7	1.7
31	75		35		1.2	1.4	
MEAN	43.8	81.8	68.4	11.5	2.7	1.2	1.5
AC-FT	2690	4870	4210	687	167	74	91

[1/] USGS Station

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 49

1991 Daily Mean Discharge
(In cubic feet per second)

SUSAN RIVER ABOVE NO. 44 DIVERSION

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15			NO RECORD FOR 1991				
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
MEAN							
AC-FT							

TABLE 50

1991 Daily Mean Discharge
(In cubic feet per second)

SUSAN RIVER ABOVE CONFLUENCE OF WILLOW CREEK

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	0.5	11	13	8.9	0.0	0.1	0.2
2	0.5	6.7	16	7.9	0.0	0.2	0.2
3	1.5	11	15	7.3	0.0	0.0	0.1
4	46	18	13	5.9	0.0	0.0	0.0
5	60 1/	18	13	4.6	0.0	0.2	0.0
6	12	21	12	3.2	0.0	0.0	0.0
7	4.1	60 1/	9.8	2.5	0.0	0.0	0.0
8	3.0	37	14	2.5	0.0	0.0	0.0
9	3.4	21	20	2.5	0.0	0.0	0.0
10	3.4	27	20	4.3	0.0	0.0	0.0
11	3.4	35	20	4.3	0.0	0.0	0.0
12	3.4	22	22	4.1	0.0	0.1	0.0
13	3.4	15	18	4.1	0.0	0.0	0.0
14	3.4	14	16	3.8	0.0	0.0	0.0
15	3.4	16	14	3.6	0.0	0.0	0.0
16	3.4	20	19	3.0	0.2	0.0	0.0
17	3.4	18	20	2.0	0.0	0.0	0.0
18	3.4	13	26	1.0	0.0	0.0	0.0
19	3.4	13	22	0.0	0.0	0.0	0.0
20	3.4	12	27	0.0	0.8	0.0	0.0
21	3.4	9.5	26	0.0	1.0	0.2	0.0
22	3.4	9.2	22	0.0	0.8	0.8	0.0
23	3.4	11	18	0.0	0.8	0.8	0.0
24	4.1	12	15	0.0	0.0	0.5	0.0
25	4.5	14	13	0.0	0.0	0.5	0.0
26	4.6	20	12	0.0	0.0	0.5	0.0
27	4.6	18	12	0.0	0.0	0.0	0.0
28	5.1	19	12	0.0	0.0	0.0	0.0
29	4.6	19	12	0.0	0.8	0.0	0.0
30	4.6	16	13	0.0	0.0	0.0	0.0
31	4.6		11		0.0	0.0	
MEAN	6.9E	18.5E	16.7	2.5	0.1	0.1	0.02
AC-FT	426 E	1102 E	1023	151	8.0	7.0	0.9

1/ Flows were in excess of the measuring device's capacity of 60 cfs.

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 51

1990 Daily Mean Discharge
(In cubic feet per second)

GOLD RUN CREEK NEAR SUSANVILLE

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	0.4	5.0	15	8.8	1.9	0.4	0.1
2	4.0	3.0	15	8.8	1.7	0.4	0.1
3	15	5.6	15	8.8	1.4	0.4	0.1
4	15	5.0	15	8.7	1.4	0.4	0.1
5	3.1	7.6	15	6.6	1.4	0.4	0.1
6	2.5	24	15	6.6	1.3	0.4	0.1
7	1.4	15	15	4.2	1.1	0.3	0.2
8	1.2	10	15	4.2	1.1	0.2	0.2
9	1.4	9.2	12	3.7	1.0	0.2	0.2
10	1.4	9.2	7.6	3.6	1.0	0.1	0.2
11	1.4	8.0	6.6	3.4	1.0	0.1	0.2
12	1.4	3.0	6.6	3.2	1.0	0.1	0.2
13	1.4	3.0	7.6	3.2	1.0	0.1	0.2
14	1.4	4.6	7.6	2.6	1.0	0.1	0.2
15	1.4	6.2	7.6	2.6	0.9	0.1	0.2
16	1.4	5.0	10	2.4	0.9	0.1	0.2
17	1.4	3.0	10	2.2	0.9	0.1	0.2
18	1.4	5.0	7.6	2.2	0.8	0.1	0.2
19	1.4	7.6	6.6	2.4	0.8	0.1	0.2
20	1.4	9.2	9.2	2.4	1.0	0.1	0.2
21	1.4	10	11	2.4	1.1	0.1	0.2
22	1.4	11	12	2.4	0.9	0.1	0.2
23	1.4	13	14	2.0	0.6	0.1	0.2
24	1.4	14	15	1.8	0.6	0.1	0.2
25	1.4	11	14	1.8	0.7	0.1	0.2
26	1.4	10	0.4	0.8	0.6	0.1	0.2
27	1.4	11	13	1.8	0.6	0.1	0.2
28	2.2	12	13	2.6	0.6	0.1	0.2
29	2.4	14	12	2.4	0.6	0.1	0.2
30	2.4	15	12	2.2	0.5	0.1	0.2
31	3.0		10		0.4	0.1	
MEAN	2.6	8.9	12	3.7	1.0	0.2	0.2
AC-FT	159	529	712	222	60	10	11

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 52

1991 Daily Mean Discharge
(In cubic feet per second)

WILLOW CREEK NEAR SUSANVILLE[1/]

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	21	26	19	10	6.8	3.4	6.3
2	21	25	20	11	6.6	3.5	6.9
3	31	24	19	11	6.2	3.5	7.1
4	67	13	18	11	6.0	3.7	7.1
5	81	16	17	12	6.0	3.7	7.4
6	53	21	17	12	5.9	3.6	7.7
7	45	23	16	12	5.8	3.6	7.6
8	43	21	15	12	5.7	3.6	7.6
9	39	20	16	12	5.8	3.3	8.0
10	34	20	16	12	5.7	3.2	8.1
11	34	19	17	11	5.7	3.1	8.1
12	31	19	15	9.8	5.5	3.4	9.0
13	34	16	13	8.9	5.3	3.0	8.9
14	35	19	14	7.9	5.1	3.1	9.1
15	34	20	16	7.3	5.1	3.2	9.2
16	32	20	17	6.8	5.0	3.8	9.4
17	30	19	18	6.4	4.9	3.8	9.6
18	31	17	19	6.4	4.8	3.7	9.8
19	35	16	19	6.6	4.7	4.1	9.9
20	35	15	20	6.5	4.8	5.9	9.7
21	35	15	19	6.5	4.7	6.9	8.9
22	32	15	17	6.4	4.6	6.9	9.9
23	30	15	15	6.4	4.6	5.2	11
24	30	18	14	6.3	4.4	5.1	10
25	34	19	14	6.3	4.4	5.2	8.0
26	38	19	13	6.3	4.2	6.5	6.4
27	36	17	12	6.6	4.0	6.7	6.1
28	33	16	12	6.9	3.8	6.9	5.9
29	29	17	11	7.0	3.8	6.9	5.7
30	27	17	11	6.9	3.7	6.6	5.2
31	26		10		3.4	6.2	
MEAN	36	18.6	15.8	8.6	5.1	4.6	8.1
AC-FT	2210	1100	970	512	311	280	483

[1/] USGS Station.

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 53

1991 Daily Mean Discharge
(In cubic feet per second)

WILLOW CREEK (ABOVE MAPES BIG SPRINGS) NEAR SUSANVILLE

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	15	18	12	6.7	3.0E	0.0E	2.5E
2	15	17	12	7.1	2.8E	0.0E	3.1E
3	25	16	12	7.1	2.4E	0.0E	3.3E
4	63	8.9	11	8.0	2.2E	0.0E	3.3E
5	71	8.9	11	7.7	2.2E	0.0E	3.6E
6	38	13	10	8.4	2.1E	0.0E	3.9E
7	33	15	8.9	8.0E	2.0E	0.0E	3.8E
8	34	13	9.4	8.0E	1.9E	0.0E	3.8E
9	30	12	9.4	8.0E	2.0E	0.0E	4.7E
10	26	12	9.6	8.0E	1.9E	0.0E	4.3E
11	26	10	10	7.0E	1.9E	0.0E	4.3E
12	26	10	8.2	5.8E	1.7E	0.0E	5.2E
13	26	8.0	7.7	4.9E	1.5E	0.0E	5.1E
14	27	11	10	3.9E	1.3E	0.0E	5.3E
15	27	12	12	3.3E	1.3E	0.0E	5.4E
16	25	11	13	2.8E	1.2E	0.0E	5.6E
17	22	11	15	2.4E	1.1E	0.0E	5.8E
18	24	8.2	15	2.4E	0.9E	0.0E	6.0E
19	27	7.7	16	2.6E	1.0E	0.5E	6.1E
20	27	7.3	17	2.5E	0.9E	2.3E	5.9E
21	27	8.0	16	2.5E	0.8E	3.3E	6.1E
22	24	7.0	15	2.4E	0.8E	3.3E	6.1E
23	22	7.7	13	2.4E	0.6E	2.6E	7.2E
24	23	11	11	2.3E	0.6E	2.5E	6.2E
25	26	13	11	2.3E	0.4E	2.6E	4.2E
26	29	12	11	2.3E	0.2E	2.9E	3.6E
27	29	11	9.6	2.6E	0.0E	3.1E	3.3E
28	25	10	9.4	2.9E	0.0E	3.1E	3.1E
29	21	11	8.9	3.0E	0.0E	3.3E	2.9E
30	19	11	7.7	2.9E	0.0E	3.3E	2.4E
31	18		6.7		0.0E	2.6E	
MEAN	28.1	11.0	11.2	4.7E	1.2E	1.1E	4.5E
AC-FT	1720	656	690	277 E	77 E	69 E	267 E

E - Estimated

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 54

1991 Daily Mean Discharge
(In cubic feet per second)

WILLOW CREEK AT THE CONFLUENCE OF THE SUSAN RIVER

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	12	33	20	15	8.9	4.6	11
2	15	33	21	14	6.5	4.6	8.9
3	28	31	22	14	5.9	4.6	9.2
4	60[1/]	30	21	14	5.7	4.6	8.9
5	60[1/]	27	21	13	5.4	4.6	8.6
6	60[1/]	49	20	12	4.5	4.6	7.9
7	60[1/]	27	20	12	5.9	4.6	8.9
8	59	23	19	12	6.5	4.6	8.9
9	52	25	19	12	5.5	4.6	8.9
10	43	27	19	12	4.5	4.6	8.9
11	42	26	21	12	4.6	4.6	8.9
12	39	25	21	12	4.6	4.6	8.9
13	40	25	20	11	4.6	4.6	7.9
14	45	25	20	11	4.9	4.9	7.9
15	46	23	18	8.9	5.1	4.9	8.9
16	48	25	18	7.9	5.4	4.9	7.6
17	35	24	18	5.9	5.4	4.6	9.8
18	35	24	18	6.5	5.4	4.6	11
19	43	24	18	5.9	5.4	4.6	12
20	52	23	23	5.9	5.1	4.6	12
21	52	22	22	1.2	5.4	4.6	12
22	43	21	22	6.5	5.4	13	12
23	40	21	22	6.7	5.4	14	11
24	40	21	20	6.7	5.4	12	12
25	43	20	18	6.7	5.4	11	12
26	58	21	18	8.9	5.4	10	11
27	60	21	16	9.5	5.4	10	9.5
28	58	21	14	9.5	5.4	10	9.5
29	49	21	14	9.5	5.4	10	7.9
30	38	21	14	8.2	5.4	10	6.5
31	35		15		4.9	12	
MEAN	44.6E	25.3	19.1	9.8	5.4	6.7	9.1
AC-FT	2741 E	1500	1170	585	335	414	571

[1/] Flows were in excess of the measuring device's capacity of 60 cfs.
E - Estimated

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 55

1991 Daily Mean Discharge
(In cubic feet per second)

DILL SLOUGH NEAR STANDISH

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	7.3	8.3	9.0	7.2	3.3	1.5	4.3
2	6.2	8.0	9.6	6.7	3.3	1.7	3.9
3	7.0	8.0	9.9	5.7	3.3	1.5	3.5
4	60 1/	12	10	5.2	3.3	1.5	3.3
5	60 1/	12	8.2	4.3	3.3	1.2	2.0
6	13	60 1/	7.2	4.6	3.3	1.1	1.4
7	9.9	19	NR	4.8	3.1	1.1	1.5
8	14	11	NR	4.8	2.9	1.1	1.5
9	15	16	NR	4.8	2.9	1.9	0.0
10	14	22	9.0	4.8	2.9	2.4	0.0
11	14	18	8.5	4.8	2.9	2.4	0.0
12	13	14	9.9	4.6	2.7E	3.3	1.9
13	14	15	8.5	4.6	2.4E	1.5	5.5
14	15	17	7.7	4.1	2.2E	0.8	5.9
15	15	16	6.7	3.7	2.1E	0.8	5.9
16	14	16	7.2	3.3	1.9	1.9	5.7
17	12	8.5	6.7	2.9	1.9	1.7	5.5
18	12	7.2	8.0	2.7	1.7	2.4	5.5
19	12	7.2	6.4	2.7	1.7	2.6	5.5
20	15	7.6	9.3	2.4	1.7	2.7	5.5
21	15	6.5	8.8	2.4	1.7	2.7	5.5
22	14	5.6	5.7	2.2	1.9	4.3	5.5
23	12	6.5	7.4	2.0	2.0	4.3	5.5
24	12	8.2	5.7	2.0	1.9	4.3	4.6
25	13	8.5	5.9	2.0	1.7	4.6	3.3
26	18	11	6.2	2.2	1.5	3.3	3.3
27	21	10	6.7	2.4	1.4	3.3	3.3
28	17	9.9	7.2	2.9	1.4	3.1	3.1
29	15	10	7.7	3.5	1.4	3.1	2.9
30	8.8	9.9	8.0	3.3	1.2	3.1	2.7
31	8.0		7.7		1.0	6.7	
MEAN	16.0E	13.0E	NR	3.8	2.2E	2.5	3.6
AC-FT	983 E	771 E	NR	226	138 E	154	214

1/ Flows were in excess of the measuring device's capacity of 60 cfs.
E - Estimated
NR - No Record

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 56

1991 Daily Mean Discharge
(In cubic feet per second)

OPERATION OF MCCOY AND HOG FLAT RESERVOIRS

	McCoy Flat Reservoir Inflow from Susan River		McCoy Flat Reservoir Release to Susan River		Hog Flat Reservoir Releases to Susan River
DAY	APRIL	MAY	APRIL	MAY	MAY
1		4.5		1.0	
2		4.5		1.5	
3		4.3		2.0	
4		4.0		2.0	
5		4.7		2.0	
6		8.2		2.0	
7		15		47	10[2/]
8		21		90	21
9		23		88	22
10		16		78	22
11		11		15	26
12		10		7.2	23
13		10		3.0[2/]	21
14		10			20
15		8.1			18
16		6.3			15
17		3.2[1/]			10
18					7.5
19					5.5
20					5.0
21					4.8
22					4.6
23	10[1/]				2.3[2/]
24	10				
25	7.3		5.4[2/]		
26	4.5		5.4		
27	4.5		5.4		
28	4.5		4.0		
29	4.5		2.0		
30	4.5		2.0		
31					
MEAN	6.2	9.1	4.0	26.0	14.0
AC-FT	99	325	48	672	471

[1/] No record before April 23 and no flow after May 17.
[2/] No other releases before or after this period.

SUSAN RIVER WATERMASTER SERVICE AREA

TABLE 57

1991 Daily Mean Discharge
(In cubic feet per second)

A AND B CANAL ABOVE LAKE LEAVITT

DAY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
1	2.0	6.2	0.0				
2	2.0	2.3	0.0				
3	30	4.6	0.0				
4	150	4.6	0.0				
5	150	4.6	0.0				
6	68	140	0.0				
7	22	150	0.0				
8	10	4.9	32				
9	5.9	14	61				
10	1.5	16	55				
11	1.5	10	64				
12	1.5	3.6	68				
13	1.5	0.0	27				
14	5.9	0.0	20				
15	4.6	0.0	18				
16	4.6	0.0	15				
17	4.6	0.0	10				
18	4.6	1.0	10				
19	4.6	0.0	10				
20	1.0	0.0	7.5				
21	0.0	0.0	5.0				
22	0.0	0.0	3.0				
23	0.0	0.0	2.0				
24	0.0	0.0	1.5[1/]				
25	0.0	0.0					
26	0.0	0.0					
27	0.0	0.0					
28	0.0	0.0					
29	10	0.0					
30	8.9	0.0					
31	7.3	0.0					
MEAN	15.2	13.7	17.0				
AC-FT	936	813	811				

[1/] No flow after May 24.